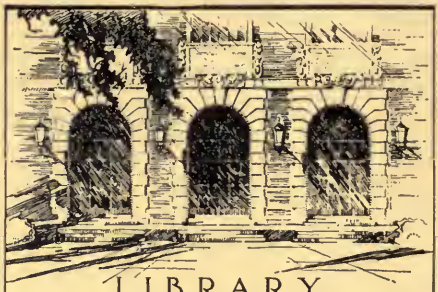

UNIVERSITY OF ILLINOIS.

Agricultural Experiment Station.

URBANA, MAY, 1898.

BULLETIN NO. 51.

VARIATIONS IN MILK AND MILK PRODUCTION.

SUMMARY.

The yield of milk from different cows under the same conditions differs greatly, and that from the same cow varies widely from day to day.

The composition of milk is highly variable; the ratio of fat to other solids, and that of solids to water, are not constant as between different cows or for the same cow on successive days.

The percentage of fat, or of other solids, is not always highest in the smaller yields, but cows that give milk with a high per cent. of solids generally show a low total yield.

Fat is the most variable constituent of milk, and its variations are independent of those of the other solids; therefore the yield of milk is a better index of the other solids than it is of the fat.

As regards the first and last milk drawn, the proportion of solids not fat is higher in the first, but the proportion of fat is decidedly greater in the last.

When the milking periods are unequal the longer period will generally, though not always, give the larger yield of milk, of fat, and of solids not fat; but the difference in yield does not correspond to the difference in time; that is, the secretion calculated per hour is greater during the shorter period.

Neither day time nor night time is shown to be superior as a milk producing period.

Different cows differ in their power to make milk from food, and the same cow varies in this respect from time to time.

It pays to select the individual according to her power to manufacture milk from food, and according to the character of the product.

Aside from the influence of food or environment each animal exhibits individual variations of her own, and such variations tend to show something like periodicity in the separate functional activities of the animal body.

How the Experiment Was Conducted.

For a period of ten months, beginning May 1, 1897, the yield of milk, of fat, and of solids not fat was determined for each of five cows and separately for each milking. Of the cows under experiment Dolly and Janet are high grade Jerseys; Jochemke (called Jock) and Lady Pietertje Veeman (called Lady Pietertje) are registered Holstein-Friesians, and Eva is a high grade of the same breed.

The animals were pastured during the summer, and in fall and winter they received the same kinds of food in such amounts as their appetites required. It was in no sense a feeding experiment, and no attempt was made to compare the yield of milk with food consumed. The sole object was to study the daily and periodic variations in the yield and the character of the milk from the same and from different animals kept under conditions as nearly as possible like those in common practice. Throughout the experiment the milking periods were by design unequal, the period from morning until evening being 11 hours and from evening until morning 13 hours. This inequality is common on the farm, excepting that the periods are generally reversed in length during the summer season.

All tests were made in duplicate. Fat was determined by the Babcock method with accurately calibrated bottles. The solids not fat were determined with the Quevenne lactometer and the results calculated from Babcock's tables.

To discover what the experiment teaches concerning certain general principles the records of all the cows for the first three months are compiled and the results tabulated and briefly discussed. The records of all the cows for the month of May though voluminous are published in full to facilitate a study of variations as between individuals. Following this are given full records of one of the cows for the entire experiment in order to afford data for a study in individual variations from day to day and throughout an extended period. All the tables are drawn upon for data bearing upon the constitution of milks produced under varying conditions as to animals and time, but not disturbed by feed. Last are certain miscellaneous data of interest in the same connection.

Variations in Milk.

Table 1. Total Yield of Milk in Pounds per Month, Morning and Evening.

	Jock.		Dolly.		Eva.		Janet.		Lady Pietertje.	
	a. m.	p. m.	a. m.	p m.	a. m.	p. m.	a. m.	p. m.	a. m.	p m.
May.....	445.5	371.6	338.7	277.1	306.1	271.3	374.6	304.0	583.4	482.9
June.....	301.4	266.4	335.8	277.0	269.0	234.3	360.7	309.3	491.6	428.3
July.....	44.6	58.5	292.6	273.4	222.1	213.0	299.4	279.8	390.7	372.2

As would be expected the largest yield is at the morning milking. The only exception is that of Jock in July at the close of her milking period. Why conditions should be reversed in her case is a mystery that is not cleared up by the closest study of her daily performances. The greatest difference in favor of the morning milking of any cow and for any month is 100.5 pounds, or 18 per cent., of Lady Pietertje for May.

The question next arising is whether or not the excess of the morning's milking over that of the evening corresponds exactly to the difference in the length of periods which are to each other as 13 to 11. To throw light upon this question the following table is constructed:

Table 2. Yield of Milk Calculated in Pounds per Hour, Morning and Evening.

	Jock.		Dolly.		Eva.		Janet.		Lady Pietertje.	
	a. m.	p. m.	a. m.	p. m.	a. m.	p. m.	a. m.	p. m.	a. m.	p. m.
May.....	1.10	1.09	.84	.81	.76	.80	.93	.89	1.45	1.42
June.....	.71	.81	.86	.84	.61	.71	.92	.94	1.26	1.30
July.....	.13	.20	.75	.83	.55	.62	.77	.85	.97	1.09

Of the fifteen calculations in the above table ten show that more milk was secreted for each hour of the time from morning until evening, and five show more milk secreted for each hour of the longer period from evening till morning. The differences in favor of the longer period are very slight and never over .04 of a pound per hour, or about 4 per cent. On the other hand the excess in favor of the shorter period is commonly much larger—in case of Lady Pietertje for July rising to .12 of a pound or 11 per cent.; and in the case of Eva for June to .1 of a pound per hour, or 14 per cent. This difference in favor of greater rapidity of milk secretion between the morning and evening milkings may be due either to the shorter period or to the time of day. Experiments now in progress in which the milking periods are each 12 hours in length have thus far failed to show any advantage of the day over the night for milk secretions. (See table 10, p. 83.) This seems to indicate that for milking periods of unequal length the yield of the shorter is greater in proportion to the time involved than that of the longer.

Variations in Fat.

Table 3. Total Yield of Fat in Pounds per Month Morning and Evening Milk.

	Jock.		Dolly.		Eva.		Janet.		Lady Pietertje.	
	a. m.	p. m.	a. m.	p. m.	a. m.	p. m.	a. m.	p. m.	a. m.	p. m.
May.....	15.30	13.60	15.60	13.40	10.30	9.93	15.70	13.27	18.43	17.73
June.....	10.60	9.90	14.71	12.23	9.24	8.59	15.15	13.06	15.79	14.25
July.....	1.73	2.22	13.21	12.23	7.73	7.78	13.17	12.43	13.37	13.70

The same general principle appears to hold in the yield of fat as in the yield of milk; namely, that the greater yield is from the longer period. Yet there are three exceptions: one of Jock as she is going dry, one of Lady Pietertje in July in which she yielded 2½ per cent. more fat in the shorter period, and one of Eva in the same month with a slight excess in favor of the evening milking. Again, it is interesting to notice below the rate at which this fat has been manufactured per hour during both the longer and the shorter periods:

Table 4. Yield of Fat Calculated in Pounds per Hour, Morning and Evening Milk.

	Jock.		Dolly.		Eva.		Janet.		Lady Pietertje.	
	a. m.	p. m.	a. m.	p. m.	a. m.	p. m.	a. m	p. m.	a. m.	p. m.
May.....	.038	.040	.039	.039	.026	.029	.039	.039	.046	.052
June.....	.027	.030	.038	.037	.024	.026	039	.039	.041	.043
July.....	.005	.008	.032	.037	.019	.023	.034	.038	.033	.040

Even more pronounced than in the case of milk, the calculated hourly manufacture of fat is greater in the shorter period. Out of the fifteen cases there are but three exceptions. In two of these the secretion per hour is the same for the two periods and in the remaining instance the excess in favor of the longer period is but .0001 of a pound per hour, a difference that is insignificant. On the contrary the differences in favor of the shorter period are pronounced and in one instance it is .007, or seven times as great as the greatest difference in favor of the longer period. The evidence is unmistakable, and to the effect that the rate of secretion of fat is more rapid for the shorter period.

Because of the considerable excess in time in favor of the long period more fat was yielded at the morning milking, and yet the tendency to greater production of fat during the shorter time was so marked that in nearly every case the average per cent. of fat was higher for the evening milking.

TABLE 5. THE AVERAGE PER CENT. OF FAT, MORNING AND EVENING MILK.

	Jock.		Dolly.		Eva.		Janet.		Lady Pietertje.	
	a. m.	p. m.	a. m.	p. m.	a. m.	p. m.	a. m.	p. m.	a. m.	p. m.
May	3.43	3.66	4.60	4.84	3.36	3.66	4.19	4.37	3.16	3.67
June.....	3.51	3.71	4.38	4.42	3.43	3.67	4.20	4.22	3.21	3.33
July..... ..	3.88	3.80	4.51	4.47	3.48	3.65	4.40	4.44	3.42	3.68

VARIATIONS IN SOLIDS NOT FAT.

TABLE 6. TOTAL YIELD OF SOLIDS NOT FAT IN POUNDS PER MONTH, MORNING AND EVENING MILK.

	Jock.		Dolly.		Eva.		Janet.		Lady Pietertje.	
	a. m.	p. m.	a. m.	p. m.	a. m.	p. m.	a. m	p. m.	a. m.	p. m.
May	41.98	35.34	32.01	25.99	26.85	24.18	33.63	26.89	52.51	43.70
June.....	29.91	26.33	31.77	26.27	24.28	21.32	33.15	27.90	44.39	38.64
July.... ...	4.32	5.89	27.81	25.68	20.42	19.36	27.29	25.31	35.79	33.78

With one exception the yield of solids not fat is greatest for the morning milking, and that exception is with Jock in July, whose milk yield for that month is higher during the shorter period. This exception is notable, not only because it is the only exception, but because the excess yielded during the shorter periods amounted to nearly 25 per cent. It will be noted that Jock in going dry reverses nearly every principle established by the other cows. That this is due to individuality and not to the fact of going dry may be seen by a study of the records of Lady Pietertje for October. The following table is prepared in order to learn whether this excess in favor of the morning corresponds with the increased time involved:

TABLE 7. YIELD OF SOLIDS NOT FAT CALCULATED IN POUNDS PER HOUR, MORNING AND EVENING MILK.

	Jock.		Dolly.		Eva.		Janet.		Lady Pietertje.	
	a. m.	p. m.	a. m.	p. m.	a. m.	p. m.	a. m.	p. m.	a. m.	p. m.
May	.104	.104	.079	.076	.069	.073	.083	.079	.130	.128
June.....	.071	.080	.081	.079	.062	.065	.085	.085	.114	.117
July.....	.012	.020	.071	.078	.051	.057	.070	.077	.089	.099

Nine of the above instances indicate a tendency to a greater hourly manufacture of solids not fat during the shorter period, but the differences are inconsiderable and notably less than the corresponding

differences in fat production. In the six remaining cases the rate of manufacture is the same for both periods or slightly in excess for the longer. This substantially agrees with the yield of milk as a whole rather than with the secretion of fat which tends much more strongly to be higher for the shorter period. So true is this that the following table showing the average per cent. of solids not fat for the morning and evening milking exhibits only inconsiderable differences, which, moreover, are by no means constant as between morning and evening milk.

TABLE 8. THE AVERAGE PER CENT. OF SOLIDS NOT FAT, MORNING AND EVENING MILK.

	Jock.		Dolly.		Eva.		Janet.		Lady Pietertje.	
	a. m.	p. m.	a. m.	p. m	a. m.	p. m.	a. m.	p. m.	a. m.	p. m.
May	9.42	9.51	9.45	9.38	9.07	9.11	8.98	8.85	9.00	9.05
June.....	9.92	9.88	9.46	9.48	9.03	9.10	9.19	9.02	9.03	9.02
July.....	9.69	10.07	9.50	9.39	9.19	9.09	9.11	9.05	9.16	9.08

VARIATION IN TOTAL SOLIDS.

It now seems well to combine the fat and solids not fat and study the rate of production of total solids.

TABLE 9. YIELD OF TOTAL SOLIDS CALCULATED PER HOUR, MORNING AND EVENING MILK.

	Jock.		Dolly.		Eva.		Janet.		Lady Pietertje.	
	a. m.	p. m.	a. m.	p. m	a. m.	p. m.	a. m.	p. m.	a. m.	p. m.
May	.142	.144	.118	.115	.095	.102	.122	.118	.176	.180
June.....	.098	.110	.119	.116	.086	.091	.124	.124	.155	.160
July.....	.017	.028	.103	.115	.070	.080	.104	.114	.122	.139
Average ..	.085	.094	.113	.115	.084	.091	.117	.119	.151	.159

With four exceptions the production of total solids calculated per hour was higher during the shorter period. Of these exceptions three were in favor of the longer period and in one the hourly production was equal in both periods. Notwithstanding these exceptions, however, the highest average for each cow is during the shorter period. The study of these tables seems to show that the constitution of milk varies with the length of the milking period, unless it may be later shown that the day time is more favorable for milk production than is the night, a contingency that has not yet been suggested by experiments at this Station, as shown by a careful study of the following table:

TABLE 10. YIELDS OF EVENING MILKINGS WHEN THE CORRESPONDING MORNING MILKINGS ARE TAKEN AT 100, AND THE PERIODS BETWEEN MILKING ARE EQUAL.

	Milk.		Fat.		Solids not fat.	
	March.	April.	March.	April.	March.	April.
Lady Pietertje.....	99	100	102	106	96	97
Eva.....	101	100	96	92	100	99
Rose.....	96	100	89	103	95	99

The above is taken from another experiment now in progress and exhibits several remarkable facts. During the month of March Eva gave more milk in the evening than in the morning, but the other two gave less. In April the yield of all was the same morning and evening. Lady Pietertje for both months gave more fat at the evening milking, but the others gave less, excepting Rose in April, leaving the evidence divided. Regarding solids not fat, they all gave less at night than in the morning, excepting Eva in March. Differences exhibited in this table are apparently slight, but being averages should be significant. They are arranged upon opposite sides of the question, and yet the differences in favor of the morning milking are greater than those in favor of the evening.

The following complete records are published to facilitate a more particular study of variations in milk. The first five pages are for five different cows during the month of May to afford a study of individual peculiarities. The fifth and nine succeeding pages exhibit the record of a single cow for ten months during which time she became fresh.

From April 30th to May 6th all the cows were on blue grass pasture, excepting on the 2d when they were confined in the barn all day. From May 7th to 15th both day and night were spent in pasture, excepting on the 9th and 13th when they were kept in the yard at night and given a feed of oat hay. On the evening of the 15th at milking time the floor of the barn was still wet and slippery from scrubbing and considerable excitement was developed on the cows coming into the barn. From May 16th to the close of the month the cows were continuously on clover pasture instead of blue grass. On the evening of May 13th Jock, Lady Pietertje, and Eva were milked an hour later than common, and on the morning of May 30th all the cows were milked an hour earlier. Dolly was in heat May 19th, and Janet May 26th.

TABLE 11. VARIATIONS IN MILK. JOCHEMKE NO. 8013. H. H. B.

Date.	Milk.		Fat.			Solids not fat.			Total solids.			Water.			Ratio fat to solids not fat.	Ratio solids not fat to water.
1897.	Pounds.		Pounds.		%	Pounds.		%	Pounds.		%	Pounds.		%		
May	a. m. p. m.	Daily	a. m. p. m.	Daily	a. m p. m	a. m. p. m.	Daily	a. m p. m	a. m. p. m.	Daily	a. m p. m.	a. m. p. m.	Daily	a. m p. m.		
	7.8		.28		3.6	.73		9.3	1.01		12.9	6.79		87.1	.38	.107
1	7.0	14.8	.28	.56	4.0	.67	1.40	9.5	.95	1.96	13.5	6.05	12.84	86.5	.42	.109
	9.4		.34		3.6	.87		9.3	1.21		12.9	8.19		87.1	.39	.106
2	7.4	16.8	.31	.65	4.2	.70	1.57	9.5	1.01	2.22	13.7	6.39	14.58	86.3	.44	.109
	7.3		.28		3.8	.71		9.7	.99		13.5	6.31		86.5	.39	.112
3	7.3	14.6	.29	.57	4.0	.66	1.37	9.1	.95	1.94	13.1	6.35	12.66	86.9	.44	.103
	8.5		.28		3.3	.77		9.0	1.05		12.2	7.45		87.7	.36	.103
4	7.2	15.7	.27	.55	3.7	.66	1.43	9.2	.93	1.98	12.9	6.27	13.72	87.1	.41	.105
	10.6		.38		3.6	.96		9.1	1.34		12.7	9.26		87.3	.40	.103
5	9.4	20.0	.31	.69	3.3	.86	1.82	9.2	1.17	2.51	12.5	8.23	17.49	87.5	.36	.105
	12.1		.40		3.3	1.10		9.1	1.50		12.4	10.60		87.6	.36	.104
6	9.6	21.7	.37	.77	3.9	.88	1.98	9.2	1.25	2.75	13.1	8.35	18.95	86.9	.42	.105
	13.0		.42		3.2	1.18		9.1	1.60		12.3	11.40		87.7	.36	.103
7	11.0	24.0	.42	.84	3.8	1.00	2.18	9.1	1.42	3.02	12.9	9.58	20.98	87.1	.42	.104
	14.5		.49		3.4	1.28		8.8	1.77		12.2	12.73		87.8	.38	.101
8	10.4	24.9	.42	.91	4.0	.98	2.26	9.4	1.40	3.17	13.4	9.00	21.73	86.6	.43	.109
	14.1		.45		3.2	1.31		9.3	1.76		12.5	12.34		87.5	.34	.107
9	12.6	26.7	.45	.90	3.6	1.17	2.48	9.3	1.62	3.38	12.9	10.98	23.32	87.1	.38	.106
	15.0		.51		3.4	1.37		9.1	1.88		12.5	13.12		87.5	.37	.105
10	10.4	25.4	.44	.95	4.2	.99	2.36	9.5	1.43	3.31	13.7	8.97	22.09	86.3	.44	.110
	14.4		.49		3.4	1.34		9.3	1.83		12.7	12.57		87.3	.37	.106
11	10.4	24.8	.42	.91	4.0	.98	2.32	9.4	1.40	3.23	13.4	9.00	21.57	86.6	.43	.109
	14.6		.50		3.4	1.33		9.1	1.83		12.5	12.77		87.5	.38	.104
12	10.6	25.2	.44	.94	4.2	1.02	2.35	9.6	1.46	3.29	13.8	9.14	21.91	86.2	.43	.101
	14.2		.50		3.5	1.32		9.3	1.82		12.8	12.38		87.2	.38	.106
13	11.0	25.2	.40	.90	3.6	1.04	2.36	9.5	1.44	3.26	13.1	9.56	21.94	86.9	.38	.108
	15.5		.48		3.1	1.41		9.1	1.89		12.2	13.61		87.8	.34	.104
14	11.0	26.5	.40	.88	3.6	1.01	2.42	9.2	1.41	3.30	12.8	9.59	23.20	87.2	.40	.105
	15.0		.51		3.4	1.38		9.2	1.89		12.6	13.11		87.4	.37	.106
15	11.1	26.1	.39	.90	3.5	1.05	2.43	9.5	1.44	3.33	13.0	9.66	22.77	87.0	.37	.108
	14.7		.51		3.5	1.38		9.4	1.89		12.9	12.81		87.1	.37	.108
16	10.7	25.4	.41	.92	3.8	1.02	2.40	9.5	1.43	3.32	13.3	9.27	22.08	86.7	.40	.109
	15.0		.45		3.0	1.40		9.3	1.85		12.3	13.15		87.7	.32	.106
17	11.8	26.8	.45	.90	3.8	1.11	2.51	9.4	1.56	3.41	13.2	10.24	23.39	86.8	.41	.108
	15.1		.54		3.6	1.43		9.5	1.97		13.1	13.13		86.9	.38	.109
18	13.7	28.8	.52	1.06	3.8	1.29	2.72	9.4	1.81	3.78	13.2	11.89	25.02	86.8	.40	.109
	15.0		.51		3.4	1.43		9.5	1.94		12.9	13.06		87.1	.36	.110
19	12.4	27.4	.35	.86	2.8	1.18	2.61	9.5	1.53	3.47	12.3	10.87	23.93	87.7	.30	.108
	17.3		.62		3.6	1.63		9.4	2.25		13.0	15.05		87.0	.38	.108
20	13.8	31.1	.58	1.20	4.2	1.32	2.95	9.6	1.90	4.15	13.8	11.90	26.95	86.2	.44	.111
	16.0		.61		3.8	1.54		9.6	2.15		13.4	13.85		86.6	.40	.111
21	14.5	30.5	.59	1.20	4.1	1.39	2.93	9.6	1.98	4.13	13.7	12.52	26.37	86.3	.42	.111
	15.8		.57		3.6	1.50		9.5	2.07		13.1	13.73		86.9	.38	.109
22	15.0	30.8	.57	1.14	3.8	1.45	2.95	9.7	2.02	4.09	13.5	12.98	26.71	86.5	.39	.111
	17.1		.62		3.6	1.66		9.7	2.28		13.3	14.82		86.7	.37	.112
23	13.8	30.9	.50	1.12	3.6	1.32	2.98	9.6	1.82	4.10	13.2	11.98	26.80	86.8	.38	.110
	16.1		.55		3.4	1.56		9.7	2.11		13.1	13.99		86.9	.35	.111
24	15.5	31.6	.56	1.11	3.6	1.47	3.03	9.5	2.03	4.14	13.1	13.47	27.46	86.9	.38	.109
	17.6		.56		3.2	1.69		9.6	2.25		12.8	15.35		87.2	.33	.109
25	14.5	32.1	.52	1.08	3.6	1.41	3.10	9.7	1.93	4.18	13.3	12.57	27.92	86.7	.37	.112
	16.3		.55		3.4	1.58		9.7	2.13		13.1	14.17		86.9	.35	.111
26	15.0	31.3	.54	1.09	3.6	1.46	3.04	9.7	2.00	4.13	13.3	13.00	27.17	86.7	.37	.112
	17.6		.58		3.3	1.69		9.6	2.27		12.9	15.33		87.1	.34	.110
27	15.2	32.8	.52	1.10	3.4	1.49	3.18	9.8	2.01	4.28	13.2	13.19	28.52	86.8	.35	.113
	16.2		.50		3.1	1.59		9.8	2.09		12.9	14.11		87.1	.31	.113
28	15.6	31.8	.51	1.01	3.3	1.51	3.10	9.7	2.02	4.11	13.0	13.58	27.69	87.0	.34	.111
	16.5		.56		3.4	1.62		9.8	2.18		13.2	14.32		86.8	.35	.113
29	15.0	31.5	.41	.97	2.7	1.47	3.09	9.8	1.88	4.06	12.5	13.12	27.44	87.5	.28	.112
	16.4		.59		3.6	1.61		9.8	2.20		13.4	14.20		86.6	.37	.113
30	14.4	30.8	.39	.98	2.7	1.41	3.02	9.8	1.80	4.00	12.5	12.60	26.80	87.5	.28	.112
	16.8		.67		4.0	1.61		9.6	2.28		13.6	14.52		86.4	.42	.111
31	14.3	31.1	.60	1.27	4.2	1.37	2.98	9.6	1.97	4.25	13.8	12.33	26.85	86.2	.44	.111
Sum. a. m	445.5		15.30			41.98			57.28			388.22				
Sum. p. m	371.6	817.1	13.63	28.93		35.34	77.32		48.97	106.25		322.63	710.85			
Av. a. m	14.3		.49		3.4	1.35		9.4	1.84			12.52		87.1		
Av. p. m	12.0	26.3	.44	.93	3.7	1.14	2.49	9.5	1.58	3.42		10.41	22.93	86.8		

Table 12. Variations in Milk. Dolly.

Date.	Milk.		Fat.			Solids not fat.			Total solids.			Water.			Ratio fat to solids not fat.	Ratio solids not fat to water.
1897.	Pounds.		Pounds.		%	Pounds.		%	Pounds.		%	Pounds.		%		
May.	a. m. / p. m.	Daily	a. m. / p. m.	Daily	a. m / p. m	a. m. / p. m.	Daily	a. m / p. m	a. m. / p. m.	Daily	a. m / p. m	a. m. / p. m.	Daily	a. m / p. m		
	9.6		.40		4.2	.91		9.5	1.31		13.7	8.29		86.3	.44	.109
1	7.5	17.1	.38	.78	5.0	.76	1.67	10.1	1.14	2.45	15.1	6.36	14.65	84.9	.50	.119
	9.0		.40		4.4	.90		10.0	1.30		14.4	7.70		85.6	.44	.117
2	7.6	16.6	.33	.73	4.4	.69	1.59	9.1	1.02	2.32	13.5	6.58	14.28	86.5	.48	.105
	10.0		.46		4.6	.95		9.5	1.41		14.1	8.59		85.9	.48	.110
3	8.2	18.2	.36	.82	4.4	.75	1.70	9.2	1.11	2.52	13.6	7.09	15.68	86.4	.48	.106
	9.4		.39		4.2	.89		9.5	1.28		13.7	8.12		86.3	.44	.109
4	7.8	17.2	.36	.75	4.6	.69	1.58	8.9	1.05	2.33	13.5	6.75	14.87	86.5	.52	.101
	10.6		.46		4.3	1.00		9.4	1.46		13.7	9.14		86.3	.46	.109
5	8.8	19.4	.42	.88	4.8	.82	1.82	9.3	1.24	2.70	14.1	7.56	16.70	85.9	.51	.108
	10.7		.47		4.4	1.01		9.4	1.48		13.8	9.22		86.2	.47	.109
6	8.7	19.4	.40	.87	4.6	.80	1.81	9.2	1.20	2.68	13.8	7.50	16.72	86.2	.50	.107
	10.8		.50		4.6	1.02		9.4	1.52		14.0	9.28		86.0	.49	.109
7	9.0	19.8	.45	.95	5.0	.81	1.83	9.0	1.26	2.78	14.0	7.74	17.02	86.0	.56	.105
	11.2		.48		4.3	1.04		9.3	1.52		13.6	9.68		86.4	.46	.107
8	9.0	20.2	.47	.95	5.2	.85	1.89	9.5	1.32	2.84	14.7	7.68	17.36	85.3	.55	.110
	11.4		.52		4.6	1.08		9.5	1.60		14.1	9.80		85.9	.48	.110
9	10.0	21.4	.50	1.02	5.0	.91	1.99	9.1	1.41	3.01	14.1	8.59	18.39	85.9	.55	.106
	11.6		.51		4.4	1.09		9.4	1.60		13.8	10.00		86.2	.47	.109
10	10.0	21.6	.50	1.01	5.0	.90	1.99	9.0	1.40	3.00	14.0	8.60	18.60	86.0	.56	.105
	11.0		.48		4.4	1.00		9.1	1.48		13.5	9.52		86.5	.48	.105
11	8.4	19.4	.48	.96	5.7	.81	1.81	9.6	1.29	2.77	15.3	7.11	16.63	84.7	.59	.114
	12.0		.56		4.7	1.09		9.1	1.65		13.8	10.35		86.2	.51	.105
12	8.0	20.0	.45	1.01	5.6	.74	1.83	9.3	1.19	2.84	14.9	6.81	17.16	85.1	.61	.109
	11.0		.47		4.3	1.03		9.4	1.50		13.7	9.50		86.3	.46	.108
13	8.5	19.5	.41	.88	4 8	.77	1.80	9.1	1.18	2.68	13.9	7.32	16.82	86.1	.53	.105
	11.1		.53		4.8	1.00		9.0	1.53		13.8	9.57		86.2	.53	.104
14	8.7	19.8	.38	.91	4.4	.79	1.79	9.1	1.17	2.70	13.5	7.53	17.10	86.5	.48	.105
	11.9		.56		4.7	1.11		9.3	1.67		14.0	10.23		86.0	.50	.109
15	7.1	19.0	.34	.90	4.8	.67	1.78	9.4	1.01	2.68	14.2	6.09	16.32	85.8	.51	.109
	10.5		.52		5.0	1.00		9.5	1.52		14.5	8.98		85.5	.52	.110
16	8.5	19.0	.42	.94	4.9	.77	1.77	9.0	1.19	2.71	13.9	7 31	16.29	86.1	.55	.105
	11.3		.52		4.6	1.06		9.4	1.58		14.0	9.72		86.0	.49	.109
17	8.5	19.8	.39	.91	4.6	.82	1.88	9.6	1.21	2.79	14.2	7.29	17.01	85.8	.48	.112
	11.2		.53		4.7	1.08		9.6	1.61		14.3	9.59		85.7	.49	.112
18	9.2	20.4	.43	.96	4.7	.88	1.96	9.6	1.31	2.92	14.3	7.89	17.48	85.7	.49	.111
	11.1		.53		4.8	1.08		9.7	1.61		14.5	9.49		85.5	.49	.113
19	8.5	19.6	.46	.99	5.4	.79	1.87	9.3	1.25	2.86	14.7	7.25	16.74	85.3	.58	.108
	10.0		.50		5.0	.95		9.5	1.45		14.5	8.55		85.5	.53	.115
20	9.4	19.4	.44	.94	4.7	.91	1.86	9.7	1.35	2.80	14.4	8.05	16.60	85.6	.48	.112
	10.4		.50		4.8	.99		9.5	1.49		14.3	8.91		85.7	.51	.111
21	9.5	19.9	.50	1.00	5.3	.89	1.88	9.4	1.39	2.88	14.7	8.11	17.02	85.3	.56	.109
	10.5		.55		5.2	1.00		9.5	1.55		14.7	8.95		85.3	.55	.111
22	8.9	19.4	.45	1.00	5.0	.85	1.85	9.5	1.30	2.85	14.5	7.60	16.55	85.5	.53	.112
	11.6		.55		4.7	1.11		9.6	1.66		14.3	9.94		85.7	.50	.112
23	8.1	19.7	.39	.94	4.8	.75	1.86	9.2	1.14	2.80	14.0	6.96	16.90	86.0	.52	.107
	10.1		.50		5.0	.99		9.8	1.49		14.8	8.61		85.2	.51	.115
24	9.5	19.6	.48	.98	5.0	.91	1.90	9.6	1.39	2.88	14.6	8.11	16.72	85.4	.53	.112
	11.7		.51		4.4	1.09		9.3	1.60		13.7	10.10		86.3	.47	.108
25	9.4	21.1	.43	.94	4.6	.89	1.98	9.5	1.32	2.92	14.1	8.08	18.18	85.9	.48	.109
	11.6		.53		4.6	1.10		9.5	1.63		14.1	9.97		85.9	.48	.110
26	10.0	21.6	.47	1.00	4.7	.95	2.05	9.5	1.42	3.05	14.2	8.58	18.55	85.8	.49	.110
	12.0		.55		4.6	1.14		9.5	1.69		14.1	10.31		85.9	.48	.111
27	9.9	21.9	.44	.99	4.4	.94	2.08	9.5	1.38	3.07	13.9	8.52	18.83	86.1	.47	.111
	11.0		.51		4.6	1.03		9.4	1.54		14.0	9.46		86.0	.50	.108
28	9.3	20.3	.45	.96	4.8	.89	1.92	9.6	1.34	2.88	14.4	7.96	17.42	85.6	.51	.111
	11.0		.54		4.9	1.03		9.4	1.57		14.3	9.43		85.7	.52	.109
29	10.0	21.0	.50	1.04	5.0	.98	2.01	9.8	1.48	3.05	14.8	8.52	17.95	85.2	.51	.115
	11.0		.48		4.4	1.06		9.6	1.54		14.0	9.46		86.0	.45	.112
30	11.0	22.0	.45	.93	4.1	1.06	2.12	9.6	1.51	3.05	13.7	9.49	18.95	86.3	.42	.112
	12.4		.56		4.5	1.18		9.5	1.74		14.0	10.66		86.0	.47	.110
31	10.1	22.5	.48	1.04	4.8	.95	2.13	9.4	1.43	3.17	14.2	8.67	19.33	85.8	.51	.109
Sum. a. m	338.7		15.57			32.01			47.58			291.12				
Sum. p. m	277.1	615.8	13.41	28.98		25.99	58.00		39.40	86.98		237.70	528.82			
Av. a. m	10.9		.50		4.6	1.03		9.5	1.53			9.39		85.9		
Av. p. m	8.9	19.8	.43	.93	4.8	.84	1.87	9.4	1.27	2.80		7.67	17.06	85.8		

TABLE 13. VARIATIONS IN MILK. EVA.

Date.	Milk.		Fat.			Solids not fat.			Total solids.			Water.			Ratio fat to solids not fat.	Ratio solids not fat to water.
1897.	Pounds.		Pounds.		%	Pounds.		%	Pounds.		%	Pounds.		%		
May	a. m. / p. m.	Daily	a. m. / p. m.	Daily	a. m / p. m	a. m. / p. m.	Daily	a. m / p. m	a. m. / p. m.	Daily	a. m / p. m	a. m. / p. m.	Daily	a. m / p. m		
	8.0		.30		3.8	.73		9.1	1.03		12.9	6.97		87.1	.41	.104
1	7.0	15.0	.29	.59	4.2	.67	1.40	9.6	.96	1.99	13.8	6.04	13.01	86.2	.43	.112
	8.6		.33		3.8	.83		9.6	1.16		13.4	7.44		86.6	.40	.112
2	7.8	16.4	.31	.64	4.0	.73	1.56	9.4	1.04	2.20	13.4	6.76	14.20	86.6	.42	.107
	8.0		.29		3.6	.76		9.5	1.05		13.1	6.95		86.9	.38	.109
3	7.6	15.6	.29	.58	3.8	.69	1.45	9.1	.98	2.03	12.9	6.62	13.57	87.1	.42	.105
	7.8		.27		3.5	.73		9.3	1.00		12.8	6.80		87.2	.37	.107
4	8.4	16.2	.30	.57	3.6	.75	1.48	8.9	1.05	2.05	12.5	7.35	14.15	87.5	.40	.101
	8.8		.30		3.4	.79		9.0	1.09		12.4	7.71		87.6	.38	.103
5	9.5	18.3	.31	.61	3.3	.85	1.64	8.9	1.16	2.25	12.2	8.34	16.05	87.8	.36	.102
	9.6		.32		3.3	.85		8.9	1.17		12.2	8.43		87.8	.38	.101
6	9.3	18.9	.37	.69	4.0	.84	1.69	9.0	1.21	2.38	13.0	8.09	16.52	87.0	.44	.104
	9.7		.32		3.3	.87		9.0	1.19		12.3	8.51		87.7	.37	.102
7	9.4	19.1	.38	.70	4.0	.86	1.73	9.1	1.24	2.43	13.1	8.16	16.67	86.9	.44	.105
	10.0		.36		3.6	.85		8.5	1.21		12.1	8.79		87.9	.42	.097
8	8.1	18.1		Sam	ple	bottle	brok	en.	Day	left	out	of cal	culati	ons.		
	10.4		.35		3.4	.95		9.1	1.30		12.5	9.10		87.5	.37	.104
9	9.6	20.0	.36	.71	3.7	.87	1.82	9.1	1.23	2.53	12.8	8.37	17.47	87.2	.41	.104
	10.5		.38		3.6	.93		8.9	1.31		12.5	9.19		87.5	.41	.101
10	9.1	19.6	.35	.73	3.8	.83	1.76	9.1	1.18	2.49	12.9	7.92	17.11	87.1	.42	.105
	9.9		.33		3.3	.88		8.9	1.21		12.2	8.69		87.8	.38	.101
11	8.1	18.0	.33	.66	4.1	.74	1.62	9.1	1.07	2.28	13.2	7.03	15.72	86.8	.45	.106
	9.9		.32		3.2	.87		8.8	1.19		12.0	8.71		88.0	.37	.100
12	8.0	17.9	.32	.64	4.0	.75	1.62	9.4	1.07	2 26	13.4	6.93	15.64	86.6	.43	.109
	10.0		.35		3.5	.90		9.0	1.25		12.5	8.75		87.5	.39	.102
13	8.2	18.2	.31	.66	3.8	.76	1.66	9.3	1.07	2.32	13.1	7.13	15.88	86.9	.41	.107
	10.0		.32		3.2	.89		8.9	1.21		12.1	8.79		87.9	.36	.101
14	8.3	18.3	.30	.62	3.6	.76	1.65	9.2	1.06	2.27	12.8	7.24	16.03	87.2	.39	.106
	12.2		.45		3.7	1.09		8.9	1.54		12.6	10.66		87.4	.41	.102
15	8.3	20.5	.34	.79	4.1	.76	1.85	9.1	1.10	2.64	13.2	7.20	17.86	86.8	.45	.106
	9.2		.30		3.3	.82		8.9	1.12		12.2	8.08		87.8	.37	.101
16	8.6	17.8	.32	.62	3.7	.79	1.61	9.2	1.11	2.23	12.9	7.49	15.57	87.1	.41	.105
	11.4		.38		3.3	1.03		9.0	1.41		12.3	9.99		87.7	.37	.103
17	8.5	19.9	.32	.70	3.8	.79	1.82	9.3	1.11	2.52	13.1	7.39	17.38	86.9	.41	.107
	10.5		.37		3.5	.97		9.2	1.34		12.7	9.16		87.3	.38	.105
18	9.2	19.7	.33	.70	3.6	.85	1.82	9.2	1.18	2.52	12.8	8.02	17.18	87.2	.39	.106
	11.1		.40		3.6	1.00		9.0	1.40		12.6	9.70		87.4	.40	.103
19	9.1	20.2	.35	.75	3.8	.83	1.83	9.1	1.18	2.58	12.9	7.92	17.62	87.1	.42	.105
	10.7		.42		3.9	.97		9.1	1.39		13.0	9.31		87.0	43	.104
20	8.8	19.5	.35	.77	4.0	.82	1.79	9.3	1.17	2.56	13.3	7.63	16.94	86.7	.43	.108
	9.0		.36		4.0	.84		9.3	1.20		13.3	7.80		86.7	.43	.108
21	8.1	17.1	.35	.71	4.3	.75	1.59	9.2	1.10	2.30	13.5	7.00	14.80	86.5	.47	.107
	9.3		.33		3.6	.82		8.8	1.15		12.4	8.15		87.6	.40	.100
22	8.2	17.5	.31	.64	3.8	.75	1.57	9.2	1.06	2.21	13.0	7.14	15.29	87.0	.41	.106
	9.4		.34		3.6	.84		8.9	1.18		12.5	8.22		87.5	.40	.102
23	7.9	17.3	.27	.61	3.4	.73	1.57	9.2	1.00	2.18	12.6	6.90	15.12	87.4	.37	.105
	9.4		.34		3.6	.86		9.1	1.20		12.7	8.20		87.3	.40	.105
24	8.3	17.7	.32	.66	3 8	.76	1.62	9.2	1.08	2.28	13.0	7.22	15.42	87.0	.42	.106
	10.5		.37		3.5	.94		9.0	1.31		12.5	9.19		87.5	.39	.102
25	8.7	19.2	.32	.69	3.7	.81	1.75	9.3	1.13	2.44	13.0	7.57	16.76	87.0	.40	.107
	10.3		.37		3.6	.96		9.3	1.33		12.9	8.97		87.1	.39	.107
26	9.2	19.5	.32	.69	3.5	.87	1.83	9.5	1.19	2.52	13.0	8.01	16.98	87.0	.37	.109
	11.0		.34		3.1	.99		9.0	1.33		12.1	9.67		87.9	.34	.102
27	10.1	21.1	.36	.70	3.6	.92	1.91	9.1	1.28	2.61	12.7	8.82	18.49	87.3	.39	.105
	10 0		.31		3.1	.90		9.0	1.21		12.1	8.79		87.9	.34	.102
28	9.4	19.4	.32	.63	3.4	.87	1.77	9.3	1.19	2.40	12.7	8.21	17.00	87.3	.37	.106
	10.5		.34		3.2	.98		9.3	1.32		12.5	9.18		87.5	.35	.107
29	9.9	20.4	.38	.72	3.8	.92	1.90	9.3	1.30	2.62	13.1	8.60	17.78	86.9	.41	.105
	10.0		.32		3.2	.92		9.2	1.24		12.4	8.76		87.6	.35	.105
30	12.0	22.0	.43	.75	3.6	1.09	2.01	9.1	1.52	1.76	12.7	10.48	19.24	87.3	.39	.104
	10.4		.38		3.7	.94		9.0	1.32		12.7	9.08		87.3	.40	.103
31	8.6	19.0	.32	.70	3.7	.77	1.71	9.0	1.09	2.41	12.7	7.51	16.59	87.3	.42	.103
Sum. a. m	296.1		10.30			26.85			37.15			258.95				
Sum. p. m	263.2	559.3	9.93	20.23		24.18	51.03		34.11	71.26		229.09	488.04			
Av. a. m	9.9		.34		3.5	.89		9.1	1.24			8.63		87.5		
Av. p. m	8.8	18.7	.33	.67	3.8	.81	1.70	9.2	1.13	2.37		7.63	16.26	87.0		

TABLE 14. VARIATIONS IN MILK. JANET.

Date. 1897. May	Milk. Pounds. a. m. p. m.	Milk. Pounds. Daily	Fat. Pounds. a. m. p. m.	Fat. Pounds. Daily	Fat. % a. m p. m	Solids not fat. Pounds. a. m. p. m.	Solids not fat. Pounds. Daily	Solids not fat. % a. m p. m	Total solids. Pounds. a. m. p. m.	Total solids. Pounds. Daily	Total solids. % a. m p. m	Water. Pounds. a. m. p. m.	Water. Pounds. Daily	Water. % a. m p. m	Ratio fat to solids not fat.	Ratio solids not fat to water.
	9.0		.42		4.7	.76		8.4	1.18		13.1	7.82		86.9	.55	.097
1	7.4	16.4	.37	.79	5.0	.64	1.40	8.6	1.01	2.19	13.6	6.39	14.21	86.4	.58	.100
	10.1		.51		5.0	.91		9.0	1.42		14.0	8.68		86.0	.56	.105
2	8.4	18.5	.38	.89	4.5	.72	1.63	8.6	1.10	2.52	13.1	7.30	15.98	86.9	.53	.099
	10.2		.41		4.0	.92		9.0	1.33		13.0	8.87		87.0	.45	.105
3	8.4	18.6	.37	.78	4.4	.71	1.63	8.5	1.08	2.41	12.9	7.32	16.19	87.1	.52	.097
	9.7		.38		3.9	.85		8.8	1.23		12.7	7.47		87.3	.45	.114
4	9.2	18.9	.40	.78	4.3	.76	1.61	8.3	1.16	2.39	12.6	8.04	15.51	87.4	.53	.095
	12.0		.36		3.0	.98		8.2	1.34		11.2	10.66		88.8	.37	.092
5	9.2	21.2	.32	.68	3.5	.75	1.73	8.2	1.07	2.41	11.7	8.13	18.79	88.3	.43	.092
	11.9		.42		3.5	1.00		8.4	1.42		11.9	10.48		88.1	.42	.095
6	8.2	20.1	.28	.70	3.4	.62	1.62	7.5	.90	2.32	10.9	7.30	17.78	89.1	.45	.085
	11.0		.48		4.4	.89		8.1	1.37		12.5	9.63		87.5	.54	.092
7	9.6	20.6	.41	.89	4.3	.78	1.67	8.1	1.19	2.56	12.4	8.41	18.04	87.6	.53	.093
	12.1		.53		4.4	.99		8.2	1.52		12.6	10.58		87.4	.54	.094
8	9.5	21.6	.41	.94	4.3	.80	1.79	8.4	1.21	2.73	12.7	8.29	18.87	87.3	.51	.097
	11.1		.47		4.2	.97		8.7	1.44		12.9	9.66		87.1	.49	.100
9	10.5	21.6	.45	.92	4.3	.94	1.91	8.9	1.39	2.83	13.2	9.11	18.77	86.8	.48	.103
	12.5		.54		4.3	1.12		9.0	1.66		13.3	10.84		86.7	.48	.103
10	9.7	22.2	.40	.94	4.1	.85	1.97	8.7	1.25	2.91	12.8	8.45	19.29	87.2	.47	.101
	12.4		.51		4.1	1.12		9.0	1.63		13.1	10.77		86.9	.46	.104
11	9.2	21.6	.41	.92	4.5	.80	1.92	8.7	1.21	2.84	13.2	7.99	18.76	86.8	.51	.100
	12.4		.47		3.8	1.08		8.7	1.55		12.5	10.85		87.5	.44	.100
12	9.9	22.3	.48	.95	4.8	.90	1.98	9.0	1.38	2.93	13.8	8.52	19.37	86.2	.53	.106
	12.1		.51		4.2	1.13		9.3	1.64		13.5	10.46		86.5	.45	.108
13	9.7	21.8	.40	.91	4.1	.86	1.99	8.8	1.26	2.90	12.9	8.44	18.90	87.1	.47	.102
	12.9		.49		3.8	1.15		8.9	1.64		12.7	11.26		87.3	.43	.102
14	10.0	22.9	.42	.91	4.2	.86	2.01	8.6	1.28	2.92	12.8	8.72	19.98	87.2	.49	.099
	12.8		.52		4.1	1.18		9.2	1.70		13.3	11.10		86.7	.44	.101
15	8.5	21.3	.38	.90	4.5	.76	1.94	8.9	1.14	2.84	13.4	7.36	18.46	86.6	.50	.103
	11.8		.50		4.2	1.07		9.1	1.57		13.3	10.23		86.7	.47	.105
16	9.6	21.4	.41	.91	4.3	.84	1.91	8.8	1.25	2.82	13.1	8.35	18.58	86.9	.49	.101
	12.7		.53		4.2	1.16		9.2	1.69		13.4	11.01		86.6	.46	.105
17	9.5	22.2	.45	.98	4.7	.88	2.04	9.3	1.33	3.02	14.0	8.17	19.18	86.0	.51	.108
	11.8		.45		3.8	1.07		9.1	1.52		12.9	10.28		87.1	.42	.104
18	10.0	21.8	.49	.94	4.9	.91	1.98	9.1	1.40	2.92	14.0	8.60	18.88	86.0	.54	.106
	11.9		.58		4.9	1.12		9.4	1 70		14.3	10.20		85.7	.52	.110
19	10.3	22.2	.46	1.04	4.5	.97	2.09	9.4	1.43	3.13	13.9	8.87	19.07	86.1	.47	.109
	12.2		.54		4.4	1.12		9.2	1.66		13.6	10.54		86.4	.48	.106
20	11.5	23.7	.55	1.09	4.8	1.03	2.15	8.9	1.58	3.24	13.7	9.92	20.46	86.3	.53	.104
	12.6		.55		4.4	1.15		9.1	1.70		13.5	10.90		86.5	.48	.106
21	10.9	23.5	.51	1.06	4.7	.95	2.10	8.7	1.46	3.16	13.4	9.44	20.34	86.6	.54	.101
	12.6		.59		4.7	1.13		9.0	1.72		13.7	10.88		86.3	.52	.104
22	9.5	22.1	.47	1.06	5.0	.87	2.00	9.2	1.34	3.06	14.2	8.16	19.04	85.8	.54	.107
	12.5		.55		4.4	1.15		9.2	1.70		13.6	10.80		86.4	.48	.106
23	10.5	23.0	.47	1.02	4.5	.93	2.08	8.9	1.40	3.10	13.4	9.10	19.90	86.6	.51	.102
	12.6		.53		4.2	1.16		9.2	1.69		13.4	10.01		86.6	.46	.105
24	11.0	23.6	.53	1.06	4.8	.98	2.14	8.9	1.51	3.20	13.7	9.49	20.40	86.3	.54	.103
	13.2		.55		4.2	1.19		9.0	1.74		13.2	11.46		86.8	.46	.104
25	11.0	24.2	.47	1.02	4.3	.99	2.18	9.0	1.46	3.20	13.3	9.54	21.00	86.7	.47	.104
	13.0		.55		4.2	1.22		9.4	1.77		13.6	11.23		86.4	.45	.109
26	10.4	23.4	.41	.96	3.9	.96	2.18	9.2	1.37	3.14	13.1	9.03	20.26	86.9	.43	.106
	13.4		.60		4.5	1.22		9.1	1.82		13.6	11.58		86.4	.49	.106
27	10.1	23.5	.44	1.04	4.4	.94	2.16	9.3	1.38	3.20	13.7	8.72	20.30	86.3	.47	.108
	13.4		.55		4.1	1.25		9.3	1.80		13.4	11.60		86.6	.44	.108
28	11.1	24.5	.49	1.04	4.4	1.06	2.31	9.5	1.55	3.35	13.9	9.55	21.15	86.1	.46	.111
	13.0		.52		4.0	1.21		9.3	1.73		13.3	11.27		86.7	.43	.107
29	10.4	23.4	.43	.95	4.1	.94	2.15	9.1	1.37	3.10	13.2	9.03	20.30	86.8	.46	.104
	12.0		.49		4.1	1.14		9.5	1.63		13.6	10.37		86.4	.43	.110
30	11.6	23.6	.39	.88	3.4	1.08	2.22	9.3	1.47	3.10	12.7	10.13	20.50	87.3	.36	.106
	13.7		.60		4.4	1.22		8.9	1.82		13.3	11.88		86.7	.49	.103
31	9.2	22.9	.42	1.02	4.6	.81	2.03	8.8	1.23	3.05	13.4	7.97	19.85	86.6	.52	.102
Sum. a. m	374.6		15.70			33.63			49.33			324.27				
Sum. p. m	304.0	678.6	13.27	28.97		26.89	60.52		40.16	89.49		264.84	589.11			
Av. a. m	12.1		.51		4.2	1.08		9.0	1.59		13.2	10.46		86.6		
Av. p. m	9.8	21.9	.43	.94	4.4	.87	1.95	8.8	1.30	2.89	13.2	8.54	19.00	87.1		

TABLE 15. VARIATIONS IN MILK. LADY PIETERTJE VEEMAN, No. 1341 W. H. F. H. B.

Date. 1897 May	Milk. Pounds. a. m. / p. m.	Milk. Pounds. Daily	Fat. Pounds. a. m. / p. m.	Fat. Pounds. Daily	Fat. % a. m / p. m	Solids not fat. Pounds. a. m. / p. m.	Solids not fat. Pounds. Daily	Solids not fat. % a. m / p. m	Total solids. Pounds. a. m. / p. m.	Total solids. Pounds. Daily	Total solids. % a. m / p. m	Water. Pounds. a. m. / p. m.	Water. Pounds. Daily	Water. % a. m / p. m	Ratio fat to solids not fat.	Ratio solids not fat to water.
	14.4		.45		3.1	1.28		8.9	1.73		12.0	12.67		88.0	.35	.101
1	11.2	25.6	.38	.83	3.4	1.03	2.31	9.2	1.41	3.14	12.6	9.79	22.46	87.4	.37	.105
	15.1		.48		3.2	1.42		9.4	1.90		12.6	13.20		87.4	.34	.108
2	13.0	28.1	.47	.95	3.6	1.16	2.58	8.9	1.63	3.53	12.5	11.37	24.57	87.5	.41	.101
	14.2		.44		3.1	1.32		9.3	1.76		12.4	12.44		87.6	.33	.106
3	12.9	27.1	.44	.88	3.4	1.11	2.43	8.6	1.55	3.31	12.0	11.35	23.79	88.0	.40	.097
	14.6		.45		3.1	1.27		8.7	1.72		11.8	12.88		88.2	.35	.098
4	13.1	27.7	.44	.89	3.4	1.17	2.44	8.9	1.61	3.33	12.3	11.49	24.37	87.7	.38	.101
	18.0		.52		2.9	1.62		9.0	2.14		11.9	15.86		88.1	.32	.102
5	15.5	33.5	.59	1.11	3.8	1.41	3.03	9.1	2.00	4.14	12.9	13.50	29.36	87.1	.42	.104
	20.0		.58		2.9	1.76		8.8	2.34		11.7	17.66		88.3	.33	.099
6	13.9	33.9	.51	1.09	3.7	1.24	3.00	8.9	1.75	4.09	12.6	11.15	28.81	87.4	.41	.110
	18.5		.56		3.0	1.65		8.9	2.21		11.9	16.29		88.1	.34	.101
7	15.6	34.1	.56	1.12	3.6	1.37	3.02	8.8	1.93	4.14	12.4	13.67	29.96	87.6	.41	.100
	19.7		.59		3.0	1.71		8.7	2.30		11.7	17.40		88.3	.35	.098
8	15.7	35.4	.60	1 19	3.8	1.43	3.14	9.1	2.03	4.33	12.9	13.67	31.07	87.1	.42	.105
	18.9		.59		3.1	1.70		9.0	2.29		12.1	16.61		87.9	.35	.098
9	16.8	35.7	.62	1.21	3.7	1.51	3.21	9.0	2.13	4.42	12.7	14.67	31.28	87.3	.41	.103
	19.5		.58		3.0	1.72		8.8	2.30		11.8	17.20		88.2	.34	.100
10	16.0	35.5	.67	1.25	4.2	1.44	3.16	9.0	2.11	4.41	13.2	13.89	31.09	86.8	.47	.104
	18.0		.56		3.1	1.58		8.8	2.14		11.9	15.86		88.1	.35	.099
11	15.2	33.2	.64	1.20	4.2	1.35	2.93	8.9	1.99	4.13	13.1	13.21	29.07	86.9	.47	.102
	18.7		.62		3.3	1.63		8.7	2.25		12.0	16.45		88.0	.38	.099
12	14.1	32.8	.58	1.20	4.1	1.31	2.94	9.3	1 89	4.14	13.4	12.21	28.66	86.6	.44	.108
	19.0		.61		3.2	1.73		9.1	2.34		12.3	16.66		87.7	.35	.104
13	14.8	33.8	.59	1.20	4.0	1.36	3.09	9.2	1.95	4.29	13.2	12.85	29.51	86.8	.43	.106
	18.9		.60		3.2	1.72		9.1	2.32		12.3	16.58		87.7	.35	.104
14	15.4	34.3	.57	1.17	3.7	1 39	3.11	9.0	1.96	4.28	12.7	13.44	30.02	87.3	.41	.104
	18.9		.59		3.1	1.68		8.9	2.27		12.0	16.63		88.0	.35	.101
15	15.1	34.0	.54	1.13	3.6	1.37	3.05	9.1	1.91	4.18	12.7	13.19	29.82	87.3	.39	.104
	18.4		.61		3.3	1.64		8.9	2.25		12.2	16.15		87.8	.37	.101
16	15.0	33.4	.57	1.18	3.8	1.35	2.99	9.0	1.92	4.17	12.8	13.08	29.23	87.2	.42	.103
	20.0		.62		3.1	1.78		8.9	2.40		12.0	17.60		88.0	.35	.101
17	15.0	35.0	.65	1.27	4.3	1.44	3.22	9.6	2.09	4.49	13.9	12.91	30.51	86.1	.45	.112
	18.4		.61		3.3	1.67		9.1	2.28		12.4	16.12		87.6	.37	.104
18	17.2	35.6	.60	1.21	3.5	1.53	3.20	8.9	2.13	4.41	12.4	15.07	31.19	87.6	.39	.101
	20.1		.66		3.3	1.81		9.0	2.47		12.3	17.63		87.7	.36	.103
19	16.7	36.8	.65	1.31	3.9	1.50	3.31	9.0	2.15	4.62	12.9	14.55	32.18	87.1	.43	.103
	18.0		.63		3.5	1.64		9.1	2.27		12.6	15.73		87.4	.38	.105
20	15.0	33.0	.57	1.20	3.8	1.35	2.99	9.0	1.92	4.19	12.8	13.08	28.81	87.2	.42	.103
	17.5		.58		3.3	1.56		8.9	2.14		12.2	15.36		87.8	.37	.101
21	16.0	33.5	.67	1.25	4.2	1.46	3.02	9.1	2.13	4.27	13.3	13.87	29.23	86.7	.46	.106
	18.4		.63		3.4	1.66		9.0	2.29		12 4	16.11		87.6	.38	.104
22	16.9	35.3	.61	1.24	3.6	1.54	3.20	9.1	2.15	4.44	12.7	14.75	30.86	87.3	.40	.104
	21.3		.77		3.6	1.96		9.2	2.73		12.8	18.57		87.2	.39	.105
23	15.1	36.4	.54	1.31	3.6	1.34	3.30	8.9	1.88	4.61	12.5	13.22	31.79	87.5	.40	.101
	18.5		.57		3.1	1.67		9.0	2.24		12.1	16.26		87.9	.34	.103
24	16.4	34.9	.62	1.19	3.8	1.51	3.18	9.2	2.13	4.37	13.0	14.27	30.53	87.0	.41	.106
	21.2		.68		3.2	1.93		9.1	2.61		12.3	18.59		87.7	.35	.104
25	16.5	37.7	.58	1.26	3.5	1.52	3.45	9.2	2.10	4.71	12.7	14.40	32.99	87.3	.38	.106
	20.4		.63		3.1	1.86		9.1	2.49		12.2	17.91		87.8	.34	.104
26	16.4	36.8	.57	1.20	3.5	1.54	3.40	9.4	2.11	4.60	12.9	14.29	32.20	87.1	.37	.101
	22.0		.68		3.1	2.02		9.2	2.70		12.3	19.30		87.7	.34	.105
27	16.5	38.5	.54	1.22	3.3	1.53	3.55	9.3	2.07	4.77	12.6	14.43	33.73	87.4	.35	.106
	20.0		.58		2.9	1.82		9.1	2.40		12.0	17.60		88.0	.32	.104
28	16.7	36.7	.52	1.10	3.1	1.54	3.36	9.2	2.06	4.46	12.3	14.64	32.24	87.7	.34	.105
	22.1		.66		3.0	2.01		9.1	2.67		12.1	19.43		87.9	.33	.104
29	17.0	39.1	.58	1.24	3.4	1.53	3.54	9.0	2.11	4.78	12.4	14.89	34.32	87.6	.38	.103
	20.3		.65		3.2	1.85		9.1	2.50		12.3	17.80		87.7	.35	.104
30	22.8	43.1	.71	1.36	3.1	2.01	3.86	8.8	2.72	5.22	11.9	20.08	37.88	88.1	.35	.100
	20.4		.65		3.2	1.84		9.0	2.49		12.2	17.91		87.8	.35	.103
31	15.4	35.8	.55	1.20	3.6	1.36	3.20	8.8	1.91	4.40	12.4	13.49	31.40	87.6	.40	.101
Sum. a. m	583.4		18.43			52.51			70.94			512.46				
Sum. p. m	482.9	1066.3	17.73	36.16		43.70	96.21		61.43	132.37		421.47	933.93			
Av. a. m	18.8		.59		3.2	1.69		9.0	2.29			16.53		87.8		
Av. p. m	15.6	34.4	.57	1.16	3.7	1.41	3.10	9.0	1.98	4.27		13.59	30.12	87.3		

TABLE 16. VARIATIONS IN MILK. LADY PIETERTJE VEEMAN, No. 1341 W. H. F. H. B.

Date.	Milk.		Fat.			Solids-not fat.			Total solids.			Water.			Ratio fat to solids not fat.
1897	Pounds.		Pounds.		%	Pounds.		%	Pounds.		%	Pounds.		%	
June	a. m. p. m.	Daily	a. m. p. m.	Daily	a. m p. m	a. m. p. m.	Daily	a. m p. m	a. m. p. m.	Daily	a. m p. m	a. m. p. m.	Daily	a. m p. m	
	21.6		.71		3.3	1.94		9.0	2.65		12.3	18.95		87.7	.37
1	17.3	38.9	.59	1.30	3.4	1.57	3.51	9.1	2.16	4.81	12.5	15.14	34.09	87.5	.38
	21.0		.69		3.3	1.89		9.0	2.58		12.3	18.42		87.7	.37
2	16.8	37 8	.59	1.28	3.5	1.56	3.45	9.3	2.15	4.73	12.8	14.65	33.07	87.2	.38
	20.4		.63		3.1	1.82		8.9	2.45		12.0	17.95		88.0	.35
3	16.3	36.7	.54	1.17	3.3	1.48	3.30	9.1	2.02	4.47	12.4	14.28	32.23	87.6	.36
	20.5		.61		3.0	1.85		9.0	2.46		12.0	18.04		88.0	.33
4	16.2	36.7	.52	1.13	3.2	1.47	3.32	9.1	1.99	4.45	12.3	14.21	32.25	87.7	.35
	20.2		.63		3.1	1.82		9.0	2.45		12.1	17.75		87.9	.35
5	17.0	37.2	.54	1.17	3.2	1.51	3.33	8.9	2.05	4.50	12.1	14.95	32.70	87.9	.36
	19.1		.59		3.1	1.74		9.1	2.33		12.2	16.77		87.8	.34
6	17.4	36.5	.56	1.15	3.2	1.51	3.25	8.7	2.07	4.40	11.9	15.33	32.10	88.1	.37
	20.5		.62		3.0	1.82		8.9	2.44		11.9	18.06		88.1	.34
7	16.0	36.5	.51	1.13	3.2	1.44	3.26	9.0	1.95	4.39	12.2	14.05	32.11	87.8	.35
	19.2		.58		3.0	1.73		9.0	2.31		12.0	16.89		88.0	.34
8	16.3	35.5	.52	1.10	3.2	1.45	3.18	8.9	1.97	4.28	12.1	14.33	31.22	87.9	.36
	18.3		.55		3.0	1.63		8.9	2.18		11.9	16.12		88.1	.34
9	15.2	33.5	.49	1.04	3.2	1.37	3.00	9.0	1.86	4.04	12.2	13.34	29.46	87.8	.36
	17.3		.54		3.1	1.56		9.0	2.10		12.1	15.20		87.9	.35
10	14.7	32.0	.50	1.04	3.4	1.28	2.84	8.7	1.78	3.88	12.1	12.92	28.12	87.9	.39
	15.3		.52		3.4	1.44		9.4	1.96		12.8	13.34		87.2	.36
11	14.4	29.7	.46	.98	3.2	1.25	2.69	8.7	1.71	3.67	11.9	12.69	26.03	88.1	.37
	14.2		.43		3.0	1.26		8.9	1.69		11.9	12.51		88.1	.34
12	14.1	28.3	.45	.88	3.2	1.21	2.47	8.6	1.66	3.35	11.8	12.44	24.95	88.2	.37
	14.3		.46		3.2	1.27		8.9	1.73		12.1	12.57		87.9	.36
13	14.1	28.4	.44	.90	3.1	1.27	2.54	9.0	1.71	3.44	12.1	12.39	24.96	87.9	.35
	16.5		.56		3.4	1.48		9.0	2.04		12.4	14.46		87.6	.38
14	14.0	30.5	.48	1.04	3.4	1.27	2.75	9.1	1.75	3.79	12.5	12.25	26.71	87.5	.38
	16.4		.56		3.4	1.44		8.8	2.00		12.2	14.40		87.8	.39
15	15.0	31.4	.51	1.07	3.4	1.35	2.79	9.0	1.86	3.86	12.4	13.14	27.54	87.6	.38
	13.6		.48		3.5	1.20		8.8	1.68		12.3	11.92		87.7	.40
16	12.5	26.1	.42	.90	3.4	1.13	2.33	9.0	1.55	3.23	12.4	10.95	22.87	87.6	.37
	10.9		.43		3.9	.96		8.8	1.39		12.7	9.51		87.3	.45
17	11.4	22.3	.39	.82	3.4	1.03	1.99	9.0	1.42	2.81	12.4	9.98	19.49	87.6	.38
	15.0		.50		3.3	1.37		9.1	1.87		12.4	13.13		87.6	.36
18	12.6	27.6	.40	.90	3.2	1.12	2.49	8.9	1.52	3.39	12.1	11.08	24.21	87.9	.36
	15.2		.49		3.2	1.35		8.9	1.84		12.1	13.36		87.9	.36
19	12.4	27.6	.36	.85	2.9	1.12	2.47	9.0	1.48	3.32	11.9	10.92	24.28	88.1	.32
	17.0		.54		3.2	1.53		9.0	2.07		12.2	14.93		87.8	.35
20	13.2	30.2	.47	1.01	3.6	1.23	2.76	9.3	1.70	3.77	12.9	11.50	26.43	87.1	.38
	16.5		.51		3.1	1.49		9.0	2.00		12.1	14.50		87.9	.34
21	13.5	30.0	.43	.94	3.2	1.23	2.72	9.1	1.66	3.66	12.3	11.84	26.34	87.7	.35
	16.7		.52		3.1	1.50		9.0	2.02		12.1	14.68		87.9	.35
22	14.9	31.6	.49	1.01	3.3	1.37	2.87	9.2	1.86	3.88	12.5	13.04	27.72	87.5	.36
	15.6		.48		3.1	1.44		9.2	1.92		12.3	13.68		87.7	.33
23	14.3	29.9	.46	.94	3.2	1.30	2.74	9.1	1.76	3.68	12.3	12.54	26.22	87.7	.35
	15.7		.50		3.2	1.46		9.3	1.96		12.5	13.74		87.5	.34
24	13.1	28.8	.45	.95	3.4	1.21	2.67	9.2	1.66	3.62	12.6	11.44	25.18	87.4	.37
	13.6		.41		3.0	1.26		9.3	1.67		12.3	11.93		87.7	.33
25	12.8	26.4	.51	.92	4.0	1.20	2.46	9.4	1.71	3.38	13.4	11.09	23.02	86.6	.43
	13.4		.43		3.2	1.22		9.1	1.65		12.3	11.75		87.7	.35
26	12.9	26.3	.44	.87	3.4	1.21	2.43	9.4	1.65	3.30	12.8	11.25	23.00	87.2	.36
	14.3		.49		3.4	1.36		9.5	1.85		12.9	12.45		87.1	.36
27	13.6	27.9	.46	.95	3.4	1.24	2.60	9.1	1.70	3.55	12.5	11.90	24.35	87.5	.37
	13.7		.47		3.4	1.27		9.3	1.74		12.7	11.96		87.3	.37
28	12.3	26.0	.42	.89	3.4	1.11	2.38	9.0	1.53	3.27	12.4	10.77	22.73	87.6	.38
	13.0		.43		3.3	1.16		8.9	1.59		12.2	11.41		87.8	.37
29	12.1	25.1	.41	.84	3.4	1.08	2.24	8.9	1.49	3.08	12.3	10.61	22.02	87.7	.38
	12.6		.43		3.4	1.13		9.0	1.56		12.4	11.04		87.6	.38
30	11.9	24.5	.44	.87	3.7	1.07	2.20	9.0	1.51	3.07	12.7	10.39	21.43	87.3	.41
Sum. a. m	491.6		15.79			44.39			60.18			431.42			
Sum. p. m	428.3	919.9	14.25	30.04		38.64	83.03		52.89	113.07		375.41	806.83		
Av. a. m	16.4		.53		3.2	1.48		9.0	2.00			14.38		87.8	
Av. p. m	14.2	30.6	.47	1.00	3.3	1.29	2.77	9.0	1.76	3.77		12.51	26.89	87.7	

TABLE 17. VARIATIONS IN MILK. LADY PIETERTJE VEEMAN, No. 1341 W. H. F. H. B.

Date. 1897 July	Milk. Pounds.		Fat. Pounds.		Fat. %	Solids not fat. Pounds.		Solids not fat. %	Total solids. Pounds.		Total solids. %	Water. Pounds.		Water. %	Ratio fat to solids not fat.
	a. m. / p. m.	Daily	a. m. / p. m.	Daily	a. m. / p. m.	a. m. / p. m.	Daily	a. m. / p. m.	a. m. / p. m.	Daily	a. m. / p. m.	a. m. / p. m.	Daily	a. m. / p. m.	
	11.5		.41		3.6	1.01		8.8	1.42		12.4	10.08		87.6	.41
1	10.5	22.0	.35	.76	3.3	.93	1.94	8.9	1.28	2.70	12.2	9.22	19.30	87.8	.38
	14.2		.45		3.2	1.24		8.7	1.69		11.9	12.51		88.1	.36
2	12.5	26.7	.49	.94	3.9	1.15	2.39	9.2	1.64	3.33	13.1	10.86	23.37	86.9	.43
	12.5		.50		4.0	1.15		9.2	1.65		13.2	10.85		86.8	.43
3	11.7	24.2	.46	.96	3.9	1.09	2.24	9.3	1.55	3.20	13.2	10.15	21.00	86.8	.42
	12.5		.49		3.9	1.21		9.7	1.70		13.6	10.80		86.4	.40
4	12.5	25.0	.45	.94	3.6	1.18	2.39	9.4	1.63	3.33	13.0	10.87	21.67	87.0	.38
	12.8		.51		4.0	1.19		9.3	1.70		13.3	11.10		86.7	.43
5	9.6	22.4	.46	.97	4.8	.92	2.11	9.6	1.38	3.08	14.4	8.22	19.32	85.6	.50
	10.4		.42		4.0	.97		9.3	1.39		13.3	9.01		86.7	.43
6	12.2	22.6	.46	.88	3.8	1.16	2.13	9.5	1.62	3.01	13.3	10.58	19.59	86.7	.40
	13.5		.42		3.1	1.24		9.2	1.66		12.3	11.84		87.7	.34
7	12.2	25.7	.52	.94	4.3	1.12	2.36	9.2	1.64	3.30	13.5	10.56	22.40	86.5	.46
	13.2		.46		3.5	1.21		9.2	1.67		12.7	11.53		87.3	.38
8	11.7	24.9	.40	.86	3.4	1.03	2.24	8.8	1.43	3.10	12.2	10.27	21.80	87.8	.39
	12.6		.45		3.6	1.13		9.0	1.58		12.6	11.02		87.4	.40
9	10.1	22.7	.42	.87	4.2	.92	2.05	9.1	1.34	2.92	13.3	8.76	19.78	86.7	.46
	10.5		.33		3.1	.95		9.0	1.28		12.1	9.22		87.9	.35
10	12.8	23.3	.50	.83	3.9	1.13	2.08	8.8	1.63	2.91	12.7	11.17	20.39	87.3	.44
	12.0		.44		3.7	1.08		9.0	1.52		12.7	10.48		87.3	.41
11	11.6	23.6	.42	.86	3.6	1.02	2.10	8.8	1.44	2.96	12.4	10.16	20.64	87.6	.41
	12.1		.38		3.1	1.08		8.9	1.46		12.0	10.64		88.0	.35
12	12.0	24.1	.43	.81	3.6	1.07	2.15	8.9	1.50	2.96	12.5	10.50	21.14	87.5	.40
	16.7		.53		3.2	1.50		9.0	2.03		12.2	14.67		87.8	.35
13	11.5	28.2	.39	.92	3.4	1.05	2.55	9.1	1.44	3 47	12.5	10.06	24.73	87.5	.37
	12.1		.39		3.2	1.09		9.0	1.48		12.2	10.62		87.8	.36
14	12.0	24.1	.41	.80	3.4	1.07	2.16	8.9	1.48	2.96	12.3	10.52	21.14	87.7	.38
	13.0		.43		3.3	1.22		9.4	1.65		12.7	11.35		87.3	.35
15	10.8	23.8	.37	.80	3.4	.91	2.13	9.0	1.28	2.93	12.4	9.52	20.87	87.6	.41
	11.8		.37		3.1	1.06		9.0	1.43		12.1	10.37		87.9	.35
16	10.9	22.7	.38	.75	3.5	1.04	2.10	9.5	1.42	2.85	13.0	9.48	19.85	87.0	.37
	12.2		.39		3.2	1.09		8.9	1.48		12.1	10.72		87.9	.36
17	10.5	22.7	.39	.78	3.7	.96	2.05	9.1	1.35	2.83	12.8	9.15	19.87	87.2	.41
	12.0		.40		3.3	1.12		9.3	1.52		12.6	10.48		87.4	.36
18	13.0	25.0	.45	.85	3.5	1.20	2.32	9.2	1.65	3.17	12.7	11.35	21.83	87.3	.38
	13.2		.48		3.6	1.28		9.7	1.76		13.3	11.44		86.7	.38
19	13.1	26.3	.48	.96	3.7	1.21	2.49	9.2	1.69	3.45	12.9	11.41	22.85	87.1	.40
	13.5		.47		3.5	1.26		9.3	1.73		12.8	11.77		87.2	.37
20	13.7	27.2	.51	.98	3.7	1.25	2.51	9.1	1.76	3.49	12.8	11.94	23.71	87.2	.41
	12.0		.38		3.2	1.15		9.6	1.53		12.8	10.47		87.2	.33
21	14.0	26.0	.53	.91	3.8	1.25	2.40	8.9	1.78	3.31	12.7	12.22	22.69	87.3	.42
	13.6		.45		3.3	1.24		9.1	1.69		12.4	11.91		87.6	.36
22	14.1	27.7	.55	1.00	3.9	1.27	2.51	9.0	1.82	3.51	12.9	12.28	24.19	87.1	.43
	12.5		.46		3.7	1.19		9.5	1.65		13.2	10.85		86.8	.39
23	13.5	26.0	.50	.96	3.7	1.26	2.45	9.3	1.76	3.41	13.0	11.74	22.59	87.0	.40
	13.0		.46		3.5	1.22		9.4	1.68		12.9	11.32		87.1	.38
24	13.0	26.0	.49	.95	3.8	1.18	2.40	9.1	1.67	3.35	12.9	11.33	22.65	87.1	.42
	14.0		.46		3.3	1.27		9.1	1.73		12.4	12.27		87.6	.36
25	12.7	26.7	.41	.87	3.2	1.12	2.39	8.8	1.53	3.26	12.0	11.17	23.44	88.0	.37
	14.1		.54		3.8	1.30		9.2	1.84		13.0	12.26		87.0	.42
26	11.6	25.7	.46	1.00	4.0	1.02	2.32	8.8	1.48	3.32	12.8	10.12	22.38	87.2	.45
	12.0		.40		3.3	1.08		9.0	1.48		12.3	10.52		87.7	.37
27	12.2	24.2	.44	.84	3.6	1.11	2.19	9.1	1.55	3.03	12.7	10.65	21.17	87.3	.40
	11.7		.39		3.3	1.05		9.0	1.44		12.3	10.26		87.7	.37
28	12.5	24.2	.42	.81	3.4	1.14	2.19	9.1	1.56	3.00	12.5	10.94	21.20	87.5	.37
	11.7		.37		3.2	1.05		9.0	1.42		12.2	10.28		87.8	.35
29	12.0	23.7	.40	.77	3.3	1.08	2.13	9.0	1.48	2.90	12.3	10.52	20.80	87.7	.37
	11.6		.36		3.1	1.07		9.2	1.43		12.3	10.17		87.7	.34
30	11.7	23.3	.42	.78	3.6	1.04	2.11	8.9	1.46	2.89	12.5	10.24	20.41	87.5	.40
	12.2		.38		3.1	1.09		8.9	1.47		12.0	10.73		88.0	.35
31	10.0	22.2	.34	.72	3.4	.90	1.99	9.0	1.24	2.71	12.4	8.76	19.49	87.6	.38
Sum. a. m	390.7		13.37			35.79			49.16			341.54			
Sum. p. m	372.2	762.9	13.70	27.07		33.78	69.57		47.48	96.64		324.72	666.26		
Av. a. m	12.6		.43		3.4	1.15		9.2	1.59			11.02		87.6	
Av. p. m	12.0	24.6	.44	.87	3.7	1.09	2.24	9.1	1.53	3.12		10.48	21.50	87.2	

TABLE 18. VARIATIONS IN MILK. LADY PIETERTJE VEEMAN, No. 1341 W. H. F. H. B.

Date. 1897 Aug.	Milk. Pounds.		Fat. Pounds.		Fat. %	Solids not fat. Pounds.		Solids not fat. %	Total solids. Pounds.		Total solids. %	Water. Pounds.		Water. %	Ratio fat to solids not fat.
	a. m. p. m.	Daily	a. m. p. m.	Daily	a. m p. m	a. m. p. m.	Daily	a. m p. m	a. m. p. m.	Daily	a. m p. m	a. m. p. m.	Daily	a. m p. m	
	11.0		.36		3.3	.98		8.9	1.34		12.2	9.66		87.8	.37
1	10.0	21.0	.35	.71	3.5	.86	1.84	8.6	1.21	2.55	12.1	8.79	18.45	87.9	.41
	10.4		.48		4.6	.94		9.0	1.42		13.6	8.98		86.4	.51
2	9.1	19.5	.33	.81	3.6	.78	1.72	8.6	1.11	2.53	12.2	7.99	16.97	87.8	.42
	8.6		.33		3.8	.77		8.9	1.10		12.7	7.50		87.3	.43
3	7.0	15.6	.28	.61	4.0	.63	1.40	9.0	.91	2.01	13.0	6.09	13.59	87.0	.44
	7.2		.24		3.4	.64		8.9	.88		12.3	6.32		87.7	.38
4	7.6	14.8	.30	.54	3.9	.68	1.32	9.0	.98	1.86	12.9	6.62	12.94	87.1	.44
	8.8		.32		3.6	.76		8.6	1.08		12.2	7.72		87.8	.42
5	8.0	16.8	.27	.59	3.4	.71	1.47	8.9	.98	2.06	12.3	7.02	14.74	87.7	.38
	9.5		.37		3.9	.85		8.9	1.22		12.8	8.28		87.2	.44
6	7.2	16.7	.23	.60	3.2	.66	1.51	9.1	.89	2.11	12.3	6.31	14.59	87.7	.35
	8.6		.34		3.9	.81		9.4	1.15		13.3	7.45		86.7	.42
7	9.6	18.2	.33	.67	3.4	.87	1.68	9.1	1.20	2.35	12.5	8.40	15.85	87.5	.38
	10.5		.38		3.6	1.00		9.5	1.38		13.1	9.12		86.9	.38
8	9.8	20.3	.33	.71	3.4	.90	1.90	9.2	1.23	2.61	12.6	8.57	17.69	87.4	.37
	10.9		.39		3.6	1.04		9.5	1.43		13.1	9.47		86.9	.38
9	11.7	22.6	.41	.80	3.5	1.09	2.13	9.3	1.50	2.93	12.8	10.20	19.67	87.2	.38
	12.7		.46		3.6	1.19		9.4	1.65		13.0	11.05		87.0	.39
10	12.0	24.7	.42	.88	3.5	1.09	2.28	9.1	1.51	3.16	12.6	10.49	21.54	87.4	.39
	12.4		.42		3.4	1.18		9.5	1.60		12.9	10.80		87.1	.36
11	12.5	24.9	.42	.84	3.4	1.16	2.34	9.3	1.58	3.18	12.7	10.92	21.72	87.3	.36
	11.7		.37		3.2	1.08		9.2	1.45		12.4	10.25		87.6	.34
12	12.2	23.9	.41	.78	3.4	1.10	2.18	9.0	1.51	2.96	12.4	10.69	20.94	87.6	.37
	11.5		.44		3.8	1.08		9.4	1.52		13.2	9.98		86.8	.41
13	11.0	22.5	.36	.80	3.3	1.03	2.11	9.4	1.39	2.91	12.7	9.61	19.59	87.3	.35
	12.1		.41		3.4	1.10		9.1	1.51		12.5	10.59		87.5	.37
14	11.1	23.2	.39	.80	3.5	1.01	2.11	9.1	1.40	2.91	12.6	9.70	20.29	87.4	.39
	11.4		.43		3.8	1.06		9.3	1.49		13.1	9.91		86.9	.41
15	10.2	21.6	.35	.78	3.4	.95	2.01	9.3	1.30	2.79	12.7	8.90	18.81	87.3	.37
	10.7		.34		3.2	.95		8.9	1.29		12.1	9.41		87.9	.36
16	11.4	22.1	.40	.74	3.5	1.04	1.99	9.1	1.44	2.73	12.6	9.96	19.37	87.4	.38
	11.5		.43		3.7	1.06		9.2	1.49		12.9	10.01		87.1	.41
17	9.9	21.4	.38	.81	3.8	.93	1.99	9.4	1.31	2.80	13.2	8.59	18.60	86.8	.41
	10.2		.33		3.2	.92		9.0	1.25		12.2	8.95		87.8	.36
18	9.1	19.3	.29	.62	3.2	.86	1.78	9.5	1.15	2.40	12.7	7.95	16.90	87.3	.34
	9.4		.29		3.1	.86		9.2	1.15		12.3	8.25		87.7	.34
19	9.1	18.5	.30	.59	3.3	.82	1.68	9.0	1.12	2.27	12.3	7.98	16.23	87.7	.37
	8.1		.26		3.2	.74		9.1	1.00		12.3	7.10		87.7	.35
20	11.2	19.3	.45	.71	4.0	1.03	1.77	9.2	1.48	2.48	13.2	9.72	16.82	86.8	.44
	8.6		.36		4.2	.77		9.0	1.13		13.2	7.47		86.8	.47
21	9.2	17.8	.35	.71	3.8	.84	1.61	9.1	1.19	2.32	12.9	8.01	15.48	87.1	.42
	11.6		.46		4.0	1.06		9.1	1.52		13.1	10.08		86.9	.43
22	9.1	20.7	.39	.85	4.3	.82	1.88	9.0	1.21	2.73	13.3	7.89	17.97	86.7	.48
	7.9		.27		3.4	.73		9.3	1.00		12.7	6.90		87.3	.37
23	9.8	17.7	.35	.62	3.6	.88	1.61	9.0	1.23	2.23	12.6	8.57	15.47	87.4	.40
	9.8		.35		3.6	.90		9.2	1.25		12.8	8.55		87.2	.39
24	9.0	18.8	.34	.69	3.8	.80	1.70	8.9	1.14	2.39	12.7	7.86	16.41	87.3	.43
	7.8		.27		3.5	.72		9.2	.99		12.7	6.81		87.3	.38
25	9.0	16.8	.39	.66	4.3	.82	1.54	9.1	1.21	2.20	13.4	7.79	14.60	86.6	.48
	7.4		.29		3.9	.67		9.1	.96		13.0	6.44		87.0	.43
26	8.0	15.4	.30	.59	3.8	.72	1.39	9.0	1.02	1.98	12.8	6.98	13.42	87.2	.42
	7.2		.26		3.6	.65		9.1	.91		12.7	6.29		87.3	.40
27	9.1	16.3	.35	.61	3.9	.83	1.48	9.1	1.18	2.09	13.0	7.92	14.21	87.0	.42
	7.5		.31		4.2	.70		9.3	1.01		13.5	6.49		86.5	.44
28	10.7	18.2	.55	.86	5.1	1.01	1.71	9.4	1.56	2.57	14.5	9.14	15.63	85.5	.54
	6.5		.32		4.9	.62		9.6	.94		14.5	5.56		85.5	.52
29	9.0	15.5	.39	.71	4.3	.82	1.44	9.1	1.21	2.15	13.4	7.79	13.35	86.6	.48
	7.7		.35		4.6	.74		9.6	1.09		14.2	6.61		85.8	.47
30	8.1	15.8	.29	.64	3.6	.72	1.46	8.9	1.01	2.10	12.5	7.09	13.70	87.5	.40
	8.1		.33		4.1	.78		9.6	1.11		13.7	6.99		86.3	.42
31	9.4	17.5	.36	.69	3.8	.86	1.64	9.2	1.22	2.33	13.0	8.18	15.17	87.0	.42
Sum. a. m	297.3		10.96			27.35			38.31			258.99			
Sum. p. m	300.1	597.4	11.06	22.02		27.32	54.67		38.38	76.69		261.72	520.71		
Av. a. m	9.6		.35		3.7	.88		9.2	1.23			8.35		87.1	
Av. p. m	9.7	19.3	.36	.71	3.7	.88	1.76	9.1	1.24	2.47		8.44	16.79	87.2	

TABLE 19. VARIATIONS IN MILK. LADY PIETERTJE VEEMAN, No. 1341 W. H. F. H. B.

Date.	Milk.		Fat.			Solids not fat.			Total solids.			Water.			Ratio fat to solids not fat.
1897	Pounds.		Pounds.		%	Pounds.		%	Pounds.		%	Pounds.		%	
Sept.	a. m. p. m.	Daily	a. m. p. m.	Daily	a. m p. m	a. m. p. m.	Daily	a. m p. m	a. m. p. m.	Daily	a. m p. m	a. m. p. m.	Daily	a. m p. m	
	9.2		.40		4.4	.88		9.6	1.28		14.0	7.92		86.0	.45
	8.4	17.6	.34	.74	4.0	.76	1.64	9.1	1.10	2.38	13.1	7.30	15.22	86.9	.45
	8.3		.35		4.2	.80		9.7	1.15		13.9	7.15		86.1	.44
2	8.2	16.5	.30	.65	3.7	.75	1.55	9.1	1.05	2.20	12.8	7.15	14.30	87.2	.40
	8.0		.34		4.2	.77		9.6	1.11		13.8	6.89		86.2	.44
3	7.8	15.8	.29	.63	3.7	.73	1.50	9.3	1.02	2.13	13.0	6.78	13.67	87.0	.40
	9.5		.41		4.3	.91		9.6	1.32		13.9	8.18		86.1	.45
4	8.0	17.5	.34	.75	4.3	.74	1.65	9.2	1.08	2.40	13.5	6.92	15.10	86.5	.46
	7.7		.32		4.1	.73		9.5	1.05		13.6	6.65		86.4	.44
5	7.6	15.3	.27	.59	3.6	.69	1.42	9.1	.96	2.01	12.7	6.64	13.29	87.3	.39
	7.0		.30		4.3	.68		9.7	.98		14.0	6.02		86.0	.44
6	7.5	14.5	.31	.61	4.1	.71	1.39	9.4	1.02	2.00	13.5	6.48	12.50	86.5	.44
	6.2		.25		4.0	.59		9.5	.84		13.5	5.36		86.5	.42
7	6.6	12.8	.26	.51	3.9	.61	1.20	9.3	.87	1.71	13.2	5.73	11.09	86.8	.43
	6.4		.28		4.4	.61		9.6	.89		14.0	5.51		86.0	.46
8	7.0	13.4	.34	.62	4.8	.64	1.25	9.2	.98	1.87	14.0	6.02	11.53	86.0	.53
	5.1		.22		4.4	.48		9.5	.70		13.9	4.40		86.1	.46
9	5.4	10.5	.22	.44	4.1	.52	1.00	9.6	.74	1.44	13.7	4.66	9.06	86.3	.42
	5.3		.27		5.0	.50		9.4	.77		14.4	4.53		85.6	.54
10	4.5	9.8	.20	.47	4.4	.42	.92	9.4	.62	1.39	13.8	3.88	8.41	86.2	.48
	4.6		.19		4.2	.43		9.3	.62		13.5	3.98		86.5	.44
11	4.6	9.2	.19	.38	4.2	.43	.86	9.4	.62	1.24	13.6	3.98	7.96	86.4	.44
	4.8		.18		3.8	.44		9.2	.62		13.0	4.18		87.0	.41
12	5.0	9.8	.18	.36	3.6	.46	.90	9.2	.64	1.26	12.8	4.36	8.54	87.2	.39
	6.0		.23		3.8	.55		9.1	.78		12.9	5.22		87.1	.42
13	5.1	11.1	.21	.44	4.2	.47	1 02	9.3	.68	1.46	13.5	4.42	9.64	86.5	.45
	5.0		.20		4.0	.46		9.3	.66		13.3	4.34		86.7	.43
14	5.0	10.0	.17	.37	3.4	.46	.92	9.3	.63	1.29	12.7	4.37	8.71	87.3	.37
	5.1		.20		3.9	.48		9.4	.68		13.3	4.42		86.7	.42
15	5.3	10.4	.19	.39	3.6	.49	.97	9.3	.68	1.36	12.9	4.62	9.04	87.1	.39
	5.3		.21		3.9	.50		9.5	.71		13.4	4.59		86.6	.42
16	5.1	10.4	.20	.41	4.0	.48	.98	9.4	.68	1.39	13.4	4.42	9.01	86.6	.42
	5.4		.21		3.8	.52		9.6	.73		13.4	4.67		86.6	.40
17	5.4	10.8	.18	.39	3.4	.50	1.02	9.2	.68	1.41	12.6	4.72	9.39	87.4	.36
	5.7		.17		3.0	.54		9.5	.71		12.5	4.99		87.5	.31
18	6.5	12.2	.26	.43	4.0	.62	1.16	9.5	.88	1.59	13.5	5.62	10.61	86.5	.42
	7.0		.29		4.1	.65		9.3	.94		13.4	6.06		86.6	.45
19	6.4	13.4	.22	.51	3.4	.59	1.24	9.2	.81	1.75	12.6	5.59	11.65	87.4	.37
	6.6		.24		3.7	.63		9.6	.87		13.3	5.73		86.7	.38
20	5.5	12.1	.18	.42	3.3	.51	1.14	9.2	.69	1.56	12.5	4.81	10.54	87.5	.35
	6.8		.23		3.4	.64		9.4	.87		12.8	5.93		87.2	.36
21	6.4	13.2	.23	.46	3.6	.60	1.24	9.4	.83	1.70	13.0	5.57	11.50	87.0	.38
	6.8		.26		3.8	.65		9.6	.91		13.4	5.89		86.6	.40
22	6.8	13.6	.25	.51	3.7	.63	1.28	9.3	.88	1.79	13.0	5.92	11.81	87.0	.40
	6.1		.21		3.4	.57		9.4	.78		12.8	5.32		87.2	.37
23	6.0	12.1	.20	.41	3.4	.58	1.15	9.7	.78	1.56	13.1	5.22	10.54	86.9	.34
	6.5		.25		3.8	.64		9.8	.89		13.6	5.61		86.4	.39
24	6.0	12.5	.22	.47	3.7	.58	1.22	9.6	.80	1.69	13.3	5.20	10.81	86.7	.38
	7.2		.27		3.8	.69		9.6	.96		13.4	6.24		86.6	.39
25	5.9	13.1	.22	.49	3.7	.59	1.28	10.0	.81	1.77	13.7	5.09	11.33	86.3	.37
	6.4		.20		3.2	.61		9.5	.81		12.7	5.59		87.3	.33
26	7.0	13.4	.25	.45	3.6	.68	1.29	9.7	.93	1.74	13.3	6.07	11.66	86.7	.37
	6.7		.25		3.7	.64		9.5	.89		13.2	5.81		86.8	.39
27	7.8	14.5	.30	.55	3.8	.76	1.40	9.7	1.06	1.95	13.5	6.74	12.55	86.5	.39
	7.3		.28		3.8	.69		9.5	.97		13.3	6.33		86.7	.41
28	7.2	14.5	.27	.55	3.8	.68	1.37	9.4	.95	1.92	13.2	6.25	12.58	86.8	.40
	8.1		.30		3.7	.77		9.5	1.07		13.2	7.03		86.8	.39
29	7.2	15.3	.26	.56	3.6	.67	1.44	9.3	.93	2.00	12.9	6.27	13.30	87.1	.39
	8.5		.33		3.9	.82		9.7	1.15		13.6	7.35		86.4	.40
30	7.7	16.2	.30	.63	3.9	.72	1.54	9.3	1.02	2.17	13.2	6.68	14.03	86.8	.42
Sum. a. m	198.6		7.84			18.87			26.71			171.89			
Sum. p. m	192.9	391.5	7.35	15.19		18.07	36.94		25.42	52.13		167.48	339.37		
Av. a. m	6.6		.26		3.9	.63		9.5	.89			5.73		87.0	
Av. p. m	6.4	13.0	.24	.50	3.9	.60	1.23	9.3	.85	1.74		5.58	11.31	86.7	

TABLE 20. VARIATIONS IN MILK. LADY PIETERTJE VEEMAN, No. 1341 W. H. F. H. B.

Date.	Milk.		Fat.			Solids not fat.			Total solids.			Water.			Ratio fat to solids not fat.
1897	Pounds.		Pounds.		%	Pounds.		%	Pounds.		%	Pounds.		%	
Oct.	a. m. p. m.	Daily	a. m. p. m.	Daily	a. m p. m	a. m. p. m.	Daily	a. m p. m	a. m. p. m.	Daily	a. m p. m	a. m. p. m.	Daily	a. m p. m	
	8.5		.32		3.8	.82		9.7	1.14		13.5	7.36		86.5	.39
1	8.8	17.3	.33	.65	3.8	.81	1.63	9.2	1.14	2.28	13.0	7.66	15.02	87.0	.41
	9.5		.34		3.6	.91		9.6	1.25		13.2	8.25		86.8	.37
2	8.0	17.5	.32	.66	4.0	.74	1.65	9.2	1.06	2.31	13.2	6.94	15.19	86.8	.43
	9.7		.37		3.8	.92		9.5	1.29		13.3	8.41		86.7	.40
3	7.4	17.1	.26	.63	3 5	.70	1.62	9.4	.96	2.25	12.9	6.44	14.85	87.1	.37
	10.0		.39		3.9	.94		9.4	1.33		13.3	8.67		86.7	.41
4	8.0	18.0	.30	.69	3.7	.74	1.68	9.2	1.04	2.37	12.9	6.96	15.63	87.1	.41
	8.9		.31		3.5	.84		9.4	1.15		12.9	7.75		87.1	.37
5	8.1	17.0	.32	.63	3.9	.75	1.59	9.3	1.07	2.22	13.2	7.03	14.78	86.8	.43
	8.7		.31		3.6	.83		9.5	1.14		13.1	7.56		86.9	.37
6	8.0	16.7	.30	.61	3.7	.76	1.59	9.5	1.06	2.20	13.2	6.94	14.50	86.8	.39
	9.7		.35		3.6	.90		9.3	1.25		12.9	8.45		87.1	.39
7	7.0	16.7	.25	.60	3.6	.65	1.55	9.3	.90	2.15	12.9	6.10	14.55	87.1	.38
	9.2		.33		3.6	.86		9.4	1.19		13.0	8.01		87.0	.38
8	7.4	16.6	.26	.59	3.5	.70	1.56	9.4	.96	2.15	12.9	6.44	14.45	87.1	.37
	7.9		.24		3.1	.75		9.5	.99		12.6	6.91		87.4	.32
9	7.4	15.3	.24	.48	3.3	.69	1.44	9.3	.93	1.92	12.6	6.47	13.38	87.4	.35
	8.5		.29		3.4	.80		9.4	1.09		12.8	7.41		87.2	.36
10	6.5	15.0	.23	.52	3.6	.60	1.40	9.3	.83	1.92	12.9	5.67	13.08	87.1	.38
	8.2		.34		4.2	.78		9.5	1.12		13.7	7.08		86.3	.44
11	6.6	14.8	.24	.58	3.7	.63	1.41	9.5	.87	1.99	13.2	5.73	12.81	86.8	.38
	7.5		.27		3.6	.73		9.7	1.00		13.3	6.50		86.7	.37
12	6.0	13.5	.23	.50	3.8	.57	1.30	9.5	.80	1.80	13.3	5.20	11.70	86.7	.40
	7.0		.27		3.9	.67		9.5	.94		13.4	6.06		86.6	.40
13	5.7	12.7	.22	.49	3.9	.56	1.23	9.8	.78	1.72	13.7	4.92	10.98	86.3	.39
	7.4		.27		3.7	.70		9.5	.97		13.2	6.43		86.8	.39
14	6.0	13.4	.23	.50	3.9	.59	1.29	9.8	.82	1.79	13.7	5.18	11.61	86.3	.39
	7.1		.26		3.6	.67		9.4	.93		13.0	6.17		87.0	.39
15	5.7	12.8	.20	.46	3.5	.53	1.20	9.3	.73	1.66	12.8	4.97	11.14	87.2	.38
	7.4		.26		3.5	.70		9.4	.96		12.9	6.44		87.1	.37
16	5.6	13.0	.22	.48	3.9	.54	1.24	9.6	.76	1.72	13.5	4.84	11.28	86.5	.41
	7.2		.28		3.9	.68		9.5	.96		13.4	6.24		86.6	.41
17	5.5	12.7	.21	.49	3.8	.53	1.21	9.7	.74	1.70	13.5	4.76	11.00	86.5	.40
	7.0		.26		3.7	.69		9.8	.95		13.5	6.05		86.5	.38
18	5.3	12.3	.21	.47	3.9	.51	1.20	9.7	.72	1.67	13.6	4.58	10.63	86.4	.41
	7.0		.27		3.8	.69		9.9	.96		13.7	6.04		86.3	.39
19	5.3	12.3	.21	.48	4.0	.52	1.21	9.8	.73	1.69	13.8	4.57	10.61	86.2	.40
	7.0		.24		3.4	69		9.9	.93		13.3	6.07		86.7	.35
20	5.0	12.0	.20	.44	4.0	.49	1.18	9.8	.69	1.62	13.8	4.31	10.38	86.2	.41
	5.0		.16		3.1	.49		9.8	.65		12.9	4.35		87.1	.33
21	5.2	10.2	.20	.36	3.9	.50	.99	9.7	.70	1.35	13.6	4.50	8.85	86.4	.40
	6.0		.24		4.0	.58		9.7	.82		13.7	5.18		86.3	.41
22	5.3	11.3	.22	.46	4.1	.54	1.12	10.1	.76	1.58	14.2	4.54	9.72	85.8	.41
	6.0		.22		3.7	.61		10.1	.83		13.8	5.17		86.2	.36
23	5.4	11.4	.19	.41	3.6	.53	1.14	9.8	.72	1.55	13.4	4.68	9.85	86.6	.36
	6.0		.20		3.4	.60		10.0	.80		13.4	5.20		86.6	.33
24	5.3	11.3	.22	.42	4.1	.54	1.14	10.2	.76	1.56	14.3	4.54	9.74	85.7	.41
	6.1		.24		4.0	.62		10.2	.86		14.2	5.24		85.8	.39
25	5.2	11.3	.20	.44	3.9	.54	1.16	10.3	.74	1.60	14.2	4.46	9.70	85.8	.37
	6.0		.20		3.4	.61		10.2	.81		13.6	5.19		86.4	.33
26	5.0	11.0	.18	.38	3.6	.51	1.12	10.2	.69	1.50	13.8	4.31	9.50	86.2	.35
	5.5		.19		3.5	.57		10.3	.76		13.8	4.74		86.2	.33
27	4.8	10.3	.20	.39	4.2	.49	1.06	10.3	.69	1.45	14.5	4.11	8.85	85.5	.41
	5.0		.19		3.7	.52		10.4	.71		14.1	4.29		85.9	.37
28	.....	5.1	.....	.19	....	.....	.52	....	.....	.71	....	.....	4.29	....	....
	5.1	.....	.16	.....	3.2	.52	.....	10.2	.68	.....	13.4	4.42	.....	86.6	.31
29	.....	5.1	.....	.16	....	.....	.52	....	.....	.68	....	.....	4.42	....	....
	6.5	.....	.27	.....	4.2	.69	.....	10.6	.96	.....	14.8	5.54	....	85.2	.39
30	.....	6.5	.....	.27	....	.....	.69	....	.....	.96	....	.....	5.54	....	....
	4.0	.....	.14	.....	3.6	.43	.....	10.8	.57	.....	14.4	3.43	.....	85.6	.33
31	.....	4.0	.....	.14	....	.....	.43	....	.....	.57	....	.....	3.43	....	....
Sum. a. m	204.0		7.42			19.65			27.07			176.93			
Sum. p. m	169.5	373.5	6.39	13.81		16.26	35.91		22.65	49.72		146.85	323.78		
Av. a. m	7.5		.27		3.6	.73		9.6	1.00			6.55		86.5	
Av. p. m	6.3	13.8	.24	.51	3.8	.60	1.33	9.5	.84	1.84		5.44	11.99	86.6	

TABLE 21. VARIATIONS IN MILK. LADY PIETERTJE VEEMAN, No. 1341 W. H. F. H. B.

Date.	Milk.		Fat.			Solids not fat.			Total solids.			Water.			Ratio fat to solids not fat.
1897	Pounds.		Pounds.		%	Pounds.		%	Pounds.		%	Pounds		%	
Nov.	a. m. p. m.	Daily	a. m. p. m.	Daily	a. m p. m	a. m. p. m.	Daily	a. m p. m	a. m. p. m.	Daily	a. m p. m	a. m. p. m.	Daily	a. m p. m	
1	5.5	5.5	.24	.24	4.3	.62	.62	11.2	.86	.86	15.5	4.64	4.64	84.5	.39
2	2.0	2.0	.10	.10	4.9	.23	.23	11.4	.33	.33	16.3	1.67	1.67	83.7	.43
3															
4															
5	4.8	4.8	.28	.28	5.9										
6															
7															
8	2.5	2.5	.16	.16	6.4										
9															
10															
11															
12															
13															
14															
15	6.8	6.8	.28	.28	4.1	.71	.71	10.4	.99	.99	14.5	5.81	5.81	85.5	.39
	8.5		.34		4.0	.94		11.0	1.28		15.0	7.22		85.0	.36
16	8.2	16.7	.30	.64	3.6	.82	1.76	10.0	1.12	2.40	13.6	7.08	14.30	86.4	.37
	12.0		.47		3.9	1.24		10.3	1.71		14.2	10.29		85.8	.38
17	9.5	21.5	.38	.85	4.0	.93	2.17	9.8	1.31	3.02	13.8	8.19	18.48	86.2	.41
	12.8		.46		3.6	1.29		10.1	1.75		13.7	11.05		86.3	.36
18	11.2	24.0	.41	.87	3.7	1.10	2.39	9.8	1.51	3.26	13.5	9.69	20.74	86.5	.37
	13.5		.49		3.6	1.39		10.3	1.88		13.9	11.62		86.1	.35
19	12.8	26.3	.46	.95	3.6	1.22	2.61	9.5	1.68	3.56	13.1	11.12	22.74	86.9	.38
	15.3		.52		3.4	1.50		9.8	2.02		13.2	13.28		86.8	.35
20	13.5	28.8	.49	1.01	3.6	1.28	2.78	9.5	1.77	3.79	13.1	11.73	25.01	86.9	.38
	16.5		.58		3.5	1.60		9.7	2.18		13.2	14.32		86.8	.36
21	12.8	29.3	.46	1.04	3.6	1.23	2.83	9.6	1.69	3.87	13.2	11.11	25.43	86.8	.37
	15.0		.48		3.2	1.50		10.0	1.98		13.2	13.02		86.8	.32
22	15.0	30.0	.63	1.11	4.2	1.48	2.98	9.9	2.11	4.09	14.1	12.89	25.91	85.9	.43
	16.7		.63		3.8	1.69		10.1	2.32		13.9	14.38		86.1	.37
23	13.0	29.7	.51	1.14	3.9	1.26	2.95	9.7	1.77	4.09	13.6	11.23	25.61	86.4	.40
	16.5		.59		3.6	1.63		9.9	2.22		13.5	14.28		86.5	.36
24	13.5	30.0	.51	1.10	3.8	1.31	2.94	9.7	1.82	4.04	13.5	11.68	25.96	86.5	.39
	16.2		.57		3.5	1.59		9.8	2.16		13.3	14.04		86.7	.36
25	13.5	29.7	.62	1.19	4.6	1.31	2.90	9.7	1.93	4.09	14.3	11.57	25.61	85.7	.47
	16.8		.57		3.4	1.65		9.8	2.22		13.2	14.58		86.8	.35
26	12.2	29.0	.49	1.06	4.0	1.13	2.78	9.3	1.62	3.84	13.3	10.58	25.16	86.7	.43
	15.2		.53		3.5	1.52		10.0	2.05		13.5	13.15		86.5	.35
27	14.8	30.0	.53	1.06	3.6	1.38	2.90	9.3	1.91	3.96	12.9	12.89	26.04	87.1	.38
	17.0		.54		3.2	1.61		9.5	2.15		12.7	14.85		87.3	.34
28	13.5	30.5	.49	1.03	3.6	1.30	2.91	9.6	1.79	3.94	13.2	11.71	26.56	86.8	.38
	16.2		.53		3.3	1.56		9.6	2.09		12.9	14.11		87.1	.34
29	13.5	29.7	.47	1.00	3.5	1.24	2.80	9.2	1.71	3.80	12.7	11.79	25.90	87.3	.38
	15.7		.55		3.5	1.51		9.6	2.06		13.1	13.64		86.9	.36
30	13.3	29.0	.70	1.25	5.3	1.32	2.83	9.9	2.02	4.08	15.2	11.28	24.92	84.8	.53
Sum. a. m	223.9		7.85			22.22			30.07			193.83			
Sum. p. m	190.3	414.2	7.45	15.30		18.31	40.53		25.76	55.83		164.54	358.37		
Av. a. m	14.9		.52		3.3	1.48		9.5	2.00			12.92		87.2	
Av. p. m	12.7	27.6	.50	1.02	3.9	1.22	2.70	9.6	1.72	3.72		10.97	23.89	86.4	

TABLE 22. VARIATIONS IN MILK. LADY PIETERTJE VEEMAN, No. 1341 W. H. F. H. B.

Date.	Milk.		Fat.			Solids not fat.			Total solids.			Water.			Ratio fat to solids not fat.
1897	Pounds.		Pounds.		%	Pounds.		%	Pounds.		%	Pounds.		%	
Dec.	a. m. p. m.	Daily	a. m. p. m.	Daily	a. m p. m	a. m. p. m.	Daily	a. m p. m	a. m. p. m.	Daily	a. m p. m	a. m. p. m.	Daily	a. m p. m	
	15.0		.51		3.4	1.45		9.7	1.96		13.1	13.04		86.9	.35
1	14.1	29.1	.51	1.02	3.6	1.39	2.84	9.9	1.90	3.86	13.5	12.20	25.24	86.5	.37
	16.2		.58		3.6	1.56		9.6	2.14		13.2	14.06		86.8	.37
2	13.6	29.8	.53	1.11	3.9	1.25	2.81	9.2	1.78	3.92	13.1	11.82	25.88	86.9	.42
	16.9		.61		3.6	1.59		9.4	2.20		13.0	14.70		87.0	.38
3	13.3	30.2	.53	1.14	4.0	1.22	2.81	9.2	1.75	3.95	13.2	11.55	26.25	86.8	.43
	16.0		.54		3.4	1.54		9.6	2.08		13.0	13.92		87.0	.35
4	14.5	30.5	.55	1.09	3.8	1.32	2.86	9.1	1.87	3.95	12.9	12.63	26.55	87.1	.42
	16.1		.55		3.4	1.53		9.5	2.08		12.9	14.02		87.1	.36
5	12.8	28.9	.46	1.01	3.6	1.15	2.68	9.0	1.61	3.69	12.6	11.19	25.21	87.4	.40
	16.8		.59		3.5	1.60		9.5	2.19		13.0	14.61		87.0	.37
6	13.8	30.6	.52	1.11	3.8	1.23	2.83	8.9	1.75	3.94	12.7	12.05	26.66	87.3	.42
	18.5		.65		3.5	1.74		9.4	2.39		12.9	16.11		87.1	.37
7	13.1	31.6	.51	1.16	3.9	1.22	2.96	9.3	1.73	4.12	13.2	11.37	27.48	86.8	.42
	17.4		.52		3.0	1.51		8.7	2.03		11.7	15.37		88.3	.34
8	15.4	32.8	.55	1.07	3.6	1.36	2.87	8.8	1.91	3.94	12.4	13.49	28.86	87.6	.40
	17.3		.62		3.6	1.61		9.3	2.23		12.9	15.07		87.1	.39
9	14.1	31.4	.56	1.18	4.0	1.33	2.94	9.4	1.89	4.12	13.4	12.21	27.28	86.6	.42
	17.6		.49		2.8	1.69		9.6	2.18		12.4	15.42		87.6	.29
10	14.9	32.5	.48	.97	3.2	1.37	3.06	9.2	1.85	4.03	12.4	13.05	28.47	87.6	.35
	18.4		.49		3.1	1.73		9.4	2.30		12.5	16.10		87.5	.33
11	15.2	33.6	.53	1.10	3.5	1.37	3.10	9.0	1.90	4.20	12.5	13.30	29.40	87.5	.39
	19.1		.59		3.1	1.76		9.2	2.35		12.3	16.75		87.7	.34
12	15.0	34.1	.59	1.18	3.9	1.38	3.14	9.2	1.97	4.32	13.1	13.03	29.78	86.9	.43
	19.7		.63		3.2	1.85		9.4	2.48		12.6	17.22		87.4	.34
13	14.6	34.3	.57	1.20	3.9	1.34	3.19	9.2	1.91	4.39	13.1	12.69	29.91	86.9	.43
	19.3		.66		3.4	1.85		9.6	2.51		13.0	16.79		87.0	.36
14	14.6	33.9	.50	1.16	3.4	1.33	3.18	9.1	1.83	4.34	12.5	12.77	29.56	87.5	.38
	19.3		.66		3.4	1.81		9.4	2.47		12.8	16.83		87.2	.36
15	14.4	33.7	.52	1.18	3.6	1.34	3.15	9.3	1.86	4.33	12.9	12.54	29.37	87.1	.39
	19.0		.65		3.4	1.81		9.5	2.46		12.9	16.54		87.1	.36
16	14.2	33.2	.45	1.10	3.2	1.31	3.12	9.2	1.76	4.22	12.4	12.44	28.98	87.6	.34
	20.4		.61		3.0	1.92		9.4	2.53		12.4	17.87		87.6	.32
17	15.0	35.4	.51	1.12	3.4	1.32	3.24	8.8	1.83	4.36	12.2	13.17	31.04	87.8	.39
	19.8		.57		2.9	1.84		9.3	2.41		12.2	17.39		87.8	.31
18	15.5	35.3	.53	1.10	3.4	1.36	3.20	8.8	1.89	4.30	12.2	13.61	31.00	87.8	.39
	19.8		.57		2.9	1.80		9.1	2.37		12.0	17.43		88.0	.32
19	14.7	34.5	.53	1.10	3.6	1.31	3.11	8.9	1.84	4.21	12.5	12.86	30.29	87.5	.40
	19.8		.59		3.0	1.80		9.1	2.39		12.1	17.41		87.9	.33
20	15.0	34.8	.53	1.12	3.5	1.35	3.15	9.0	1.88	4.27	12.5	13.12	30.53	87.5	.39
	19.4		.60		3.1	1.80		9.3	2.40		12.4	17.00		87.6	.33
21	15.5	34.9	.53	1.13	3.4	1.41	3.21	9.1	1.94	4.34	12.5	13.56	30.56	87.5	.38
	19.9		.64		3.2	1.87		9.4	2.51		12.6	17.39		87.4	.34
22	15.6	35.5	.55	1.19	3.5	1.40	3.27	9.0	1.95	4.46	12.5	13.05	31.04	87.5	.39
	19.9		.62		3.1	1.85		9.3	2.47		12.4	17.43		87.6	.34
23	14.5	34.4	.49	1.11	3.4	1.32	3.17	9.1	1.81	4.28	12.5	12.69	30.12	87.5	.37
	19.5		.60		3.1	1.83		9.4	2.43		12.5	17.07		87.5	.33
24	15.3	34.8	.54	1.14	3.5	1.38	3.21	9.0	1.92	4.35	12.5	13.38	30.45	87.5	.39
	19.0		.61		3.2	1.75		9.2	2.36		12.4	16.64		87.6	.35
25	16.0	35.0	.54	1.15	3.4	1.42	3.17	8.9	1.96	4.32	12.3	14.04	30.68	87.7	.38
	19.6		.59		3.0	1.80		9.2	2.39		12.2	17.21		87.8	.33
26	14.9	34.5	.48	1.07	3.2	1.36	3.16	9.1	1.84	4.23	12.3	13.06	30.27	87.7	.35
	20.5		.66		3.2	1.91		9.3	2.57		12.5	17.93		87.5	.35
27	15.6	36.1	.51	1.17	3.3	1.40	3.31	9.0	1.91	4.48	12.3	13.69	31.62	87.7	.36
	19.2		.58		3.0	1.75		9.1	2.33		12.1	16.87		87.9	.33
28	15.6	34.8	.51	1.09	3.3	1.40	3.15	9.0	1.91	4.24	12.3	13.69	30.56	87.7	.36
	20.6		.66		3.2	1.92		9.3	2.58		12.5	18.02		87.5	.34
29	14.3	34.9	.47	1.13	3.3	1.34	3.26	9.4	1.81	4.39	12.7	12.49	30.51	87.3	.35
	18.5		.59		3.2	1.81		9.8	2.40		13.0	16.10		87.0	.33
30	14.8	33.3	.46	1.05	3.1	1.32	3.13	8.9	1.78	4.18	12.0	13.02	29.12	88.0	.35
	19.3		.58		3.0	1.85		9.5	2.41		12.5	16.89		87.5	.32
31	14.6	33.9	.38	.96	2.6	1.30	3.13	8.9	1.68	4.09	11.5	12.92	29.81	88.5	.29
Sum. a. m	577.8		18.49			54.11			72.60			505.20			
Sum. p. m	454.5	1032.3	15.92	34.41		41.30	95.41		57.22	129.82		397.28	902.48		
Av. a. m	18.6		.60		3.2	1.74		9.4	2.34			16.30		87.4	
Av. p. m	14.7	33.3	.51	1.11	3.5	1.33	3.07	9.2	1.85	4.19		12.81	29 11	87.4	

TABLE 23. VARIATIONS IN MILK. LADY PIETERTJE VEEMAN, No. 1341 W. H. F. H. B.

Date.	Milk.		Fat.			Solids not fat.			Total solids.			Water.			Ratio fat to solids not fat.
1898	Pounds.		Pounds.		%	Pounds.		%	Pounds.		%	Pounds.		%	
Jan.	a. m. / p. m.	Daily	a. m. / p. m.	Daily	a. m / p. m	a. m. / p. m.	Daily	a. m / p. m	a. m. / p. m.	Daily	a. m / p. m	a. m. / p. m.	Daily	a. m / p. m	
	19.5		.53		2.7	1.83		9.4	2.36		12.1	17.14		87.9	.29
1	14.8	34.3	.49	1.02	3.3	1.35	3.18	9.1	1.84	4.20	12.4	12.96	30.10	87.6	.36
	21.2		.70		3.3	1.99		9.4	2.69		12.7	18.51		87.3	.35
2	15.2	36.4	.55	1.25	3.6	1.41	3.40	9.3	1.96	4.65	12.9	13.24	31.75	87.1	.39
	19.6		.67		3.4	1.88		9.6	2.55		13.0	17.05		87.0	.36
3	14.7	34.3	.44	1.11	3.0	1.32	3.20	9.0	1.76	4.31	12.0	12.94	29.99	88.0	.33
	20.9		.56		2.7	1.96		9.4	2.51		12.1	18.39		87.9	.29
4	15.9	36.8	.52	1.08	3.3	1.46	3.42	9.2	1.98	4.49	12.5	13.92	32.31	87.5	.36
	21.1		.65		3.1	2.00		9.5	2.65		12.6	18.45		87.4	.33
5	15.8	36.9	.51	1.16	3.2	1.44	3.44	9.1	1.95	4.60	12.3	13.85	32.30	87.7	.35
	20.5		.64		3.1	1.95		9.5	2.59		12.6	17.91		87.4	.33
6	16.2	36.7	.53	1.17	3.3	1.49	3.44	9.2	2.02	4.61	12.5	14.18	32.09	87.5	.36
	20.7		.64		3.1	1.93		9.3	2.57		12.4	18.13		87.6	.33
7	15.6	36.3	.51	1.15	3.3	1.40	3.33	9.0	1.91	4.48	12.3	13.69	31.82	87.7	.36
	20.1		.64		3.2	1.91		9.5	2.55		12.7	17.55		87.3	.34
8	16.1	36.2	.52	1.16	3.2	1.47	3.38	9.1	1.99	4.54	12.3	14.11	31.66	87.7	.35
	21.2		.64		3.0	1.99		9.4	2.63		12.4	18.57		87.6	.32
9	15.3	36.5	.47	1.11	3.1	1.44	3.43	9.4	1.91	4.54	12.5	13.49	32.06	87.5	.33
	19.1		.57		3.0	1.85		9.7	2.42		12.7	16.68		87.3	.31
10	15.5	34.6	.48	1.05	3.1	1.39	3.24	9.0	1.87	4.29	12.1	13.63	30.31	87.9	.35
	20.9		.56		2.7	1.92		9.2	2.48		11.9	18.42		88.1	.29
11	15.1	36.0	.47	1.03	3.1	1.36	3.28	9.0	1.83	4.31	12.1	13.27	31.69	87.9	.35
	20.9		.63		3.0	1.96		9.4	2.59		12.4	18.31		87.6	.32
12	15.5	36.4	.50	1.13	3.2	1.39	3.35	9.0	1.89	4.48	12.2	13.61	31.92	87.8	.36
	21.5		.60		2.8	1.98		9.2	2.58		12.0	18.92		88.0	.30
13	16.3	37.8	.51	1.11	3.1	1.47	3.45	9.0	1.98	4.56	12.1	14.32	33.24	87.9	.35
	21.4		.64		3.0	2.01		9.4	2.65		12.4	18.75		87.6	.32
14	16.0	37.4	.51	1.15	3.2	1.46	3.47	9.1	1.97	4.62	12.3	14.03	32.78	87.7	.35
	21.2		.64		3.0	1.99		9.4	2.63		12.4	18.57		87.6	.32
15	15.2	36.4	.50	1.14	3.3	1.40	3.39	9.2	1.90	4.53	12.5	13.30	31.87	87.5	.36
	21.2		.64		3.0	2.01		9.5	2.65		12.5	18.55		87.5	.32
16	16.0	37.2	.51	1.15	3.2	1.46	3.47	9.1	1.97	4.62	12.3	14.03	32.58	87.7	.35
	22.0		.64		2.9	2.09		9.5	2.73		12.4	19.27		87.6	.31
17	16.0	38.0	.50	1.14	3.1	1.42	3.51	8.9	1.92	3.65	12.0	14.08	33.35	88.0	.35
	22.0		.62		2.8	1.98		9.0	2.60		11.8	19.40		88.2	.31
18	16.8	38.8	.50	1.12	3.0	1.51	3.49	9.0	2.01	4.61	12.0	14.79	34.19	88.0	.33
	20.0		.62		3.1	1.88		9.4	2.50		12.5	17.50		87.5	.33
19	16.3	36.3	.54	1.16	3.3	1.47	3.35	9.0	2.01	4.51	12.3	14.29	31.79	87.7	.37
	21.0		.65		3.1	1.99		9.5	2.64		12.6	18.36		87.4	.33
20	16.1	37.1	.52	1.17	3.2	1.48	3.47	9.2	2.00	4.64	12.4	14.10	32.46	87.6	.35
	20.9		.69		3.3	2.01		9.6	2.70		12.9	18.20		87.1	.34
21	15.5	36.4	.48	1.17	3.1	1.39	3.40	9.0	1.87	4.57	12.1	13.63	31.83	87.9	.35
	21.5		.62		2.9	2.02		9.4	2.64		12.3	18.86		87.7	.31
22	15.6	37.1	Sample bottle broken. Day left out of calculation.												
	22.2		.71		3.2	2.13		9.6	2.84		12.8	19.36		87.2	.33
23	16.4	38.6	.49	1.20	3.0	1.48	3.61	9.0	1.97	4.81	12.0	14.43	33.79	88.0	.33
	21.6		.67		3.1	2.01		9.3	2.68		12.4	18.92		87.6	.33
24	16.1	37.7	.52	1.19	3.2	1.45	3.46	9.0	1.97	4.65	12.2	14.13	33.05	87.8	.36
	22.5		.68		3.0	2.07		9.2	2.75		12.2	19.75		87.8	.33
25	15.7	38.2	.52	1.20	3.3	1.44	3.51	9.2	1.96	4.71	12.5	13.74	33.49	87.5	.36
	20.5		.64		3.1	1.97		9.6	2.61		12.7	17.89		87.3	.32
26	15.7	36.2	.47	1.11	3.0	1.43	3.40	9.1	1.90	4.51	12.1	13.80	31.69	87.9	.33
	21.8		.65		3.0	2.09		9.6	2.74		12.6	19.06		87.4	.31
27	17.0	38.8	.53	1.18	3.1	1.51	3.60	8.9	2.04	4.78	12.0	14.96	34.02	88.0	.35
	21.6		.63		2.9	2.07		9.6	2.70		12.5	18.90		87.5	.30
28	15.1	36.7	.48	1.11	3.2	1.39	3.46	9.2	1.87	4.57	12.4	13.23	32.13	87.6	.35
	21.8		.65		3.0	2.09		9.6	2.74		12.6	19.06		87.4	.31
29	17.2	39.0	.52	1.17	3.0	1.55	3.64	9.0	2.07	4.81	12.0	15.13	34.19	88.0	.34
	21.1		.63		3.0	2.00		9.5	2.63		12.5	18.47		87.5	.32
30	16.6	37.7	.51	1.14	3.1	1.51	3.51	9.1	2.02	4.65	12.2	14.58	33.05	87.8	.33
	21.5		.65		3.0	2.04		9.5	2.69		12.5	18.81		87.5	.32
31	16.4	37.9	.51	1.16	3.1	1.53	3.57	9.3	2.04	4.73	22.4	14.36	33.17	87.6	.33
Sum. a. m	631.5		19.08			59.53			78.65			552.85			
Sum. p. m	476.1	1107.6	15.11	34.19		43.27	102.85		58.38	137.03		417.82	970.67		
Av. a. m	21.0		.64			1.99			2.62			18.43			
Av. p. m	15.9	36.9	.50	1.14		1.44	3.43		1.94	4.56		13.92	32.35		

TABLE 24. VARIATIONS IN MILK. LADY PIETERTJE VEEMAN, No. 1341 W. H. F. H. B.

Date.	Milk.		Fat.			Solids not fat.			Total solids.			Water.			Ratio fat to solids not fat.
1898	Pounds.		Pounds.		%	Pounds.		%	Pounds.		%	Pounds.		%	
Feb.	a. m. p. m.	Daily	a. m. p. m.	Daily	a. m p. m	a. m. p. m.	Daily	a. m p. m	a. m. p. m.	Daily	a. m p. m	a. m. p. m.	Daily	a. m p. m	
	21.3		.64		3.0	2.04		9.6	2.68		12.6	18.62		87.4	.31
1	15.2	36.5	.49	1.13	3.2	1.43	3.47	9.4	1.92	4.60	12.6	13.28	31.90	87.4	.34
	21.8		.68		3.1	2.09		9.6	2.77		12.7	19.03		87.3	.33
2	15.4	37.2	.49	1.17	3.2	1.40	3.49	9.1	1.89	4.66	12.3	13.51	32.54	87.7	.35
	21.4		.66		3.1	2.03		9.5	2.69		12.6	18.71		87.4	.33
3	14.6	36.0	.48	1.14	3.3	1.42	3.45	9.7	1.90	4.59	13.0	12.70	31.41	87.0	.34
	20.4		.65		3.2	2.02		9.9	2.67		13.1	17.73		86.9	.32
4	13.1	33.5	.37	1.02	2.8	1.15	3.17	8.8	1.52	4.19	11.6	11.58	29.31	88.4	.32
	20.1		.58		2.9	1.87		9.3	2.45		12.2	17.65		87.8	.31
5	15.2	35.3	.50	1.08	3.3	1.34	3.21	8.8	1.84	4.29	12.1	13.36	31.01	87.9	.37
	20.7		.64		3.1	1.91		9.2	2.55		12.3	18.15		87.7	.34
6	14.3	35.0	.47	1.11	3.3	1.27	3.18	8.9	1.74	4.29	12.2	12.56	30.71	87.8	.37
	19.4		.64		3.3	1.82		9.4	2.46		12.7	16.94		87.3	.35
7	15.5	34.9	.48	1.12	3.1	1.35	3.17	8.7	1.83	4.29	11.8	13.67	30.61	88.2	.36
	19.2		.56		2.9	1.77		9.2	2.33		12.1	16.87		87.9	.32
8	13.7	32.9	.44	1.00	3.2	1.25	3.02	9.1	1.69	4.02	12.3	12.01	28.88	87.7	.35
	19.9		.60		3.0	1.91		9.6	2.51		12.6	17.39		87.4	.31
9	13.9	33.8	.43	1.03	3.1	1.25	3.16	9.0	1.68	4.19	12.1	12.22	29.61	87.9	.34
	17.9		.57		3.2	1.74		9.7	2.31		12.9	15.59		87.1	.32
10	15.2	33.1	.49	1.06	3.2	1.37	3.11	9.0	1.86	4.17	12.2	13.34	28.93	87.8	.36
	19.3		.60		3.1	1.81		9.4	2.41		12.5	16.89		87.5	.33
11	14.7	34.0	.50	1.10	3.4	1.35	3.16	9.2	1.85	4.26	12.6	12.85	29.74	87.4	.37
	20.3		.65		3.2	1.95		9.6	2.60		12.8	17.70		87.2	.33
12	14.3	34.6	.43	1.08	3.0	1.29	3.24	9.0	1.72	4.32	12.0	12.58	30.28	88.0	.33
	20.6		.58		2.8	1.90		9.2	2.48		12.0	18.12		88.0	.31
13	14.7	35.3	.49	1.07	3.3	1.32	3.22	9.0	1.81	4.29	12.3	12.89	31.01	87.7	.37
	19.2		.60		3.1	1.82		9.5	2.42		12.6	16.78		87.4	.33
14	16.7	35.9	.57	1.17	3.4	1.57	3.39	9.4	2.14	4.56	12.8	14.56	31.34	87.2	.36
	18.0		.61		3.4	1.67		9.3	2.28		12.7	15.72		87.3	.37
15	12.8	30.8	.41	1.02	3.2	1.18	2.85	9.2	1.59	3.87	12.4	11.21	26.93	87.6	.35
	18.8		.58		3.1	1.80		9.6	2.38		12.7	16.42		87.3	.32
16	14.8	33.6	.49	1.07	3.3	1.38	3.18	9.3	1.87	4.25	12.6	12.93	29.35	87.4	.36
	17.0		.58		3.4	1.63		9.6	2.21		13.0	14.79		87.0	.36
17	16.0	33.0	.50	1.08	3.1	1.42	3.05	8.9	1.92	4.13	12.0	14.08	28.87	88.0	.35
	20.0		.66		3.3	1.86		9.3	2.52		12.6	17.48		87.4	.35
18	15.4	35.4	.49	1.15	3.2	1.43	3.29	9.3	1.92	4.44	12.5	13.48	30.96	87.5	.34
	19.4		.66		3.4	1.86		9.6	2.52		13.0	16.88		87.0	.35
19	16.0	35.4	.51	1.17	3.2	1.47	3.33	9.2	1.98	4.50	12.4	14.02	30.90	87.6	.35
	18.6		.56		3.0	1.79		9.6	2.35		12.6	16.25		87.4	.31
20	14.6	33.2	.44	1.00	3.0	1.31	3.10	9.0	1.75	4.10	12.0	12.85	29.10	88.0	.34
	16.0		.48		3.0	1.52		9.5	2.00		12.5	14.00		87.5	.32
21	14.3	30.3	.43	.91	3.0	1.30	2.82	9.1	1.73	3.73	12.1	12.57	26.57	87.9	.33
	22.0		.73		3.3	2.00		9.1	2.73		12.4	19.27		87.6	.37
22	11.5	33.5	.38	1.11	3.3	1.01	3.01	8.8	1.39	4.12	12.1	10.11	29.38	87.9	.38
	19.0		.61		3.2	1.77		9.3	2.38		12.5	16.62		87.5	.34
23	14.9	33.9	.52	1.13	3.5	1.39	3.16	9.3	1.91	4.29	12.8	12.99	29.61	87.2	.37
	20.0		.66		3.3	1.90		9.5	2.56		12.8	17.44		87.2	.35
24	13.1	33.1	.42	1.08	3.2	1.17	3.07	8.9	1.59	4.15	12.1	11.51	28.95	87.9	.36
	21.0		.67		3.2	1.97		9.4	2.64		12.6	18.36		87.4	.34
25	16.1	37.1	.53	1.20	3.3	1.47	3.44	9.1	2.00	4.64	12.4	14.10	32.46	87.6	.36
	15.0		.45		3.0	1.41		9.4	1.86		12.4	13.14		87.6	.32
26	17.3	32.3	.52	.97	3.0	1.56	2.97	9.0	2.08	3.94	12.0	15.22	28.36	88.0	.33
	19.0		.57		3.0	1.81		9.5	2.38		12.5	16.62		87.5	.31
27	16.0	35.0	.48	1.05	3.0	1.50	3.31	9.4	1.98	4.36	12.4	14.02	30.64	87.6	.32
	18.2		.62		3.4	1.77		9.7	2.39		13.1	15.81		86.9	.35
28	18.8	37.0	.60	1.22	3.2	1.71	3.48	9.1	2.31	4.70	12.3	16.49	32.30	87.7	.35
Sum. a. m	543.5		17.09			51.44			68.53			474.97			
Sum. p. m	418.1	961.6	13.35	30.44		38.06	89.50		51.41	119.94		366.69	841.66		
Av. a. m	17.5		.61		3.1	1.83		9.5	2.45			16.96		87.4	
Av. p. m	13.5	31.0	.47	1.08	3.2	1.36	3.19	9.1	1.83	4.28		13.06	30.02	87.7	

Daily Variations in Milk.

The mass of data in the preceding pages precludes anything like an extended discussion within the limits of a bulletin. They are printed in full for the benefit of such students of milk production as may be interested in giving minute attention to the numerous and somewhat unaccountable variations, both as between individuals and of the same animal for different periods.

It is only in the most general terms that cows may be said to rise and fall together in their yield of milk. The tables for May exhibit many instances in which for a time the individuals by twos and threes appear to be influenced by some circumstance which tends to increase or decrease their yield together; but shortly one of the animals separates from the company and establishes independent variations. The suggestion of these experiments, and still more of experiments now in progress, is that individual cows are subject to periodicities of their own, either because of the different influence of similar environment, or because of some physiological reason.

The reader cannot fail to observe a marvellous variation in the per cent. of fat, not only as between individuals, but with the same individuals for successive milkings and days. Jock varies from 3 per cent. to 4 per cent. in the morning, and from 2.7 per cent. to 4.2 per cent. in the evening, and differences nearly as great may be noted with the other cows, exhibiting in all an extreme variation within the month and between all the cows from 2.7 to 5.7 per cent. It is by no means true that the highest per cent. of fat is found in the smallest milking, because for nearly one-fourth of the time the larger percentage of fat is with the higher yield of milk. As between the evening milkings of Jock May 18th and 19th, the smaller milking is found to be deficient in fat by fully one per cent. The morning milkings of the 17th and 18th are practically identical in amount, but with a difference of .6 in the per cent. of fat. That these differences are not due primarily to the unequal milking period is shown by the extreme difference in the output of fat on consecutive days; see Jock May 19th and 20th with a difference of .34 of a pound, or 40 per cent.; see also Lady Pietertje May 4th and 5th with a difference of .22 of a pound, or nearly 25 per cent. Many similar instances can be readily found.

Extreme variations are to be noted in the matter of solids not fat. The following table is prepared for the purpose of exhibiting the wide variation in the percentages of fat and of solids not fat within the month.

TABLE 25. MAXIMUM AND MINIMUM PERCENTAGES OF FAT AND SOLIDS NOT FAT WITHIN THE MONTH OF MAY. MORNING PERIOD 13 HOURS, EVENING PERIOD 11 HOURS.

	Fat.				Solids not fat.			
	Maximum.		Minimum.		Maximum.		Minimum.	
	a m.	p.m.	a m.	p.m.	a.m.	p.m.	a.m.	p.m.
Jock	4.0	4.2	3.0	2.7	9.8	9.8	8.8	9.1
Dolly	5.2	5.7	4.2	4.4	10.0	10.1	9.0	9.0
Eva	4.0	4.3	3.1	3.3	9.6	9.6	8.5	8.9
Janet	6.0	5.5	3.6	2.8	12.5	10.8	7.6	6.2
Lady Pietertje	3.6	4.3	2.9	3.1	9.4	9.6	8.7	8.6

It must be clearly understood that there is no relation of time between the maxima and the minima in the above table, that is to say, the maximum percentage of fat and the maximum percentage of solids not fat may be upon the same or upon different days, and both are to a great extent independent of the yield of milk.

The last column but one of the milk records exhibits the ratio between the fat and the solids not fat for each day of the experiment, and here again notable variations are discovered. The average ratio of fats to solids not fat in the milk of Jock and Lady Pietertje for May is .37, but of Dolly for the same period it is .51. The extreme variation noted during the month as between different cows and at different milkings is .28 to .61. Nothing could be more positively correct than the statement that milk is an exceedingly variable product, not only as regards fat, but as regards the proportion of fat to the other solids.

The fat is not only more variable than the solids not fat, but its variations are in a large measure independent of those of the other solids. There are therefore some notable variations in the column of total solids. The per cent. of total solids is by no means highest in the smallest yield, as for Dolly, May 3d, when both fat and solids not fat are abnormally low. The consecutive milkings of Lady Pietertje on May 10th show a variation in the per cent. of total solids from 11.8 to 13.2, so that with a difference of 2 pounds of milk yield practically the same amount of total solids were secreted. It will be noted in passing that about this time Lady Pietertje was giving more fat in the smaller milkings than in the larger.

BEHAVIOR NEAR THE CLOSE OF A PERIOD OF LACTATION.

The records for Jock in July are not published, but close study of the data shows, that as the period of lactation neared the close the daily yields fluctuated greatly in amount. The fat was unusually variable, and together with solids not fat declined in proportion toward the end.

The ratio of fat to solids not fat and the proportion of water were unusually high, and the larger quantity was given during the shorter period.

Lady Pietertje's record is published in full, including the close of one lactation and the beginning of another. In her case there was a slight rise in the percentage of fat for the last few milkings as well as in the per cent. of total solids, both conspiring to reduce the percentage of water, but both are much less pronounced than in the case of Jock. It will be noted that upon beginning to milk but once a day, October 28th, the amount of fat and total solids immediately dropped to about half their former amounts, showing that there is no tendency to compensate for the milking period that is omitted.

It will be noted also that at the beginning of the new lactation, November 15th, the percentages of fat and of total solids were about normal.

A close study of the details of this tabular matter cannot fail to impress the reader with the belief that the cow, though dependent upon and to a great extent influenced by her environment, is yet inclined to indulge in many and often extreme individual variations, not assignable to any visible external cause. Experiments now in progress confirm this view of the case and tend to show a natural periodicity in milk secretion, such periodicity representing something like the algebraic sum of all the body functions whose activities rise and fall to some extent independent of each other or of external conditions.

The Beginning of a Period of Lactation.

Table 26. The Yield and Character of the Milk of Three Cows for the First Week of a New Period of Lactation.

	Eva.			Tina Clay.			Lady Pietertje.		
	Pounds milk.	Per cent.		Pounds milk.	Per cent.		Pounds milk.	Per cent.	
		Fat.	Solids not fat.		Fat.	Solids not fat.		Fat.	Solids not fat.
P. M.	5 0	4.7	23.1	14.0	2.8	10.8	.....	.....	.....
A. M.	4.5	4.1	*	17.0	3.2	10.7	.....	.....	.....
P. M.	6.6	2.0	*	15.0	3.8	10.3	6.8	4.1	10.4
A. M.	13.0	2.8	*	18.2	3.0	10.4	8.5	4.0	11.0
P. M.	10.5	4.0	11.0	16.0	3.6	10.1	8.2	3.6	10.0
A. M.	12.3	3.6	10.5	20.0	3.6	10.1	12.0	3.9	10.3
P. M.	10.5	4.7	10.3	17.2	3.7	10.1	9.5	4.0	9.8
A. M.	13.3	3.2	9.6	20.0	3.0	10.1	12.8	3.6	10.1
P. M.	12.8	3.9	10.0	17.1	3.7	9.7	11.2	3.7	9.8
A. M.	18.0	3.5	9.8	21.0	3.8	9.7	13.5	3.6	10.3
P. M.	14.7	3.5	9.7	19.0	4.6	9.6	12.8	3.6	9.5
A. M.	18.7	3.8	9.5	22.7	3.8	9.7	15.3	3.4	9.8
P. M.	15.2	4.1	9.5	19.4	3.7	9.7	13.5	3.6	9.5
A. M.	19.1	3.6	9.7	22.0	3.6	9.7	16.5	3.5	9.7

*Solids above 11 per cent., above the range of the lactometer used.

Eva had been dry for 38 days, Tina Clay for 64 days, and Lady Pietertje for 6 days. The first milking of the two former was taken 12 hours after dropping a calf, and that of Lady Pietertje at 36 hours.

It will be noted that, except with Tina Clay, the quantity of milk rapidly increased within the week to more than three times that of the first milking. In every case the first few milkings are extremely rich in solids not fat, but the percentage at first is widely variable, as is seen in comparing the milk of Eva with that of the other two. Eva and Lady Pietertje begin with a comparatively high per cent. of fat, but Tina Clay begins low and increases from the first. It will also be noted that this fact is associated with larger milk yields at the first milkings, which were characteristic of Tina Clay. We have already discovered that the daily production of fat is nearer constant than is the corresponding yield of milk, and this low per cent. of fat may be considered as compensation for the higher yield of milk.

Composition of First and Last Milk Drawn.

A number of tests were made of the same and of different cows in order to discover the difference, if any, between the first pint of milk drawn from the udder and the pint last drawn. The average per cent. of fat in the milk of each cow for a number of days before and after the trial is shown in the table for the sake of comparison. The udders were washed before milking, excepting where indicated by a star. It was omitted in these cases under the impression that the manipulation incident to the washing might affect the per cent. of fat in the first milk drawn. The results do not indicate, however, that such was the case. The cows were milked in the usual manner, through a funnel into a pint bottle until the first pint was secured, after which they were milked into a pail until nearly finished. Toward the close they were again milked into bottles containing one-fourth of a pint each, and when the milking was finished, the last four quarter pints were taken as representing the last pint drawn.

It will be noticed that in every case the per cent. of solids not fat is higher for the milk first drawn, and the per cent. of fat lower; but the difference between the fat of the first and last drawn is much greater than the inverse difference between the solids not fat, and its fluctuations are wider from day to day, and between different cows.

TABLE 27. COMPOSITION OF FIRST PINT AND OF LAST PINT OF THE SAME MILKING.

	Per cent fat.		Solids not fat.		Total milk.	Usual % fat.	Ratio of fat, first to last.
	First.	Last.	First.	Last.			
Tina Clay	1.6	6.4	9.7	9.33	16.6	3.5	1:4*
"	1.4	3.8	9.45	9.10	20.0	3.5	1:2.7*
"	3.0	5.8	9.61	9.35	16.0	3.5	1:1.9
"	2.1	5.6	9.65	9.55	18.5	3.5	1:2.7*
"	1.2	6.4	9.62	9.15	21.8	3.5	1:5.3
Average	1.86	5.60	9.61	9.30	18.6	3.5	1:3
Nettie	1.5	11.8	10.25	9.12	11.8	4.6	1:7.9
Janet	2.9	6.3	10.16	9.76	6.3	5.5	1:2.2
Pogis	2.5	7.6	10.03	9.74	7.3	5.1	1:3
Jane	2.8	6.7	9.96	9.80	8.4	4.9	1:2.4
Mary	1.2	7.2	9.75	9.10	8.6	3.7	1:6

*Udders unwashed.

COMPARISON OF TWO COWS.

Two mature cows, Eva, a high grade Holstein weighing 1200 pounds, and Janet, a high grade Jersey weighing 875 pounds, were fresh on the same day, March 16th. They were immediately put under experiment to test their comparative capacities for milk and butter production. During the first period of 19 days the cows received equal amounts of bran with whatever corn stover their appetites demanded. During the second period of 21 days the grain ration was of ground oats and corn in equal parts by weight, with corn stover ad libitum. During the third period of 28 days the grain ration was unchanged, but the roughness was clover hay, and during the fourth period of 23 days the grain ration consisted of corn meal and oil meal in the proportion of 4:1 taken with clover hay for roughness. Each milking was weighed, sampled, and tested separately.

It will be noticed that the animals always received the same amounts of the same kind of grain, and were allowed to satisfy their appetite in roughness. Though it cannot be said that the refuse from this roughness was always identical in feeding value, yet the animals were so fed that there was no noticeable difference in its amount or character. It will also be noticed that roughness was corn stover the first and second periods, and clover hay for the third and fourth, but that the grain was the same for the second and third periods, so that there was never a change of grain and roughness at the same time. What the cows did with this food for 91 days is fairly well shown in the following table.

TABLE 28. AMOUNT AND KIND OF FEED CONSUMED, AND AMOUNT OF MILK AND FAT PRODUCED BY TWO COWS ON THE SAME FEED FOR 91 DAYS, IN FOUR PERIODS.

	Food consumed.					
	First.	Second.	Third.	Fourth.	Totals.	Per cent
	Corn stover.	Corn stover.	Clover hay.	Clover hay.		
Eva	308.5	368	452.3	458.3	1587.1	
Janet	298.5	332.5	445.8	397.5	1471.3	
Difference	10.	35.5	6.5	60.8	112.8	7.6
	Bran.	Corn and oats.	Corn and oats.	Corn and oil meal		
Eva	207.0	295	394.5	289	1185.5	
Janet	207.0	295	394.5	289	1185.5	
	Milk produced.					
Eva	676.2	752.6	1024.7	771.1	3224.6	
Janet	411.2	488.6	692.6	574.3	2166.7	
Difference	265	264	332.1	196.8	1057.9	48.0
	Fat produced.					
Eva	27.7	26.7	34.3	26.0	114.7	
Janet	20.9	23.3	31.1	27.5	102.8	
Difference.	6.8	3.4	3.2	—1.5	11.9	11.0

We really cannot fail to note that Eva gave 48 per cent. more milk and 11 per cent. more fat on the same amount of grain and with an excess of roughness amounting to only 112 pounds, or 7.6 per cent. This points to two principles, namely, that some cows are vastly more economical consumers of feed than are others and that the character of milk produced is so different that one animal may excel in milk and another excel in fat. These cows were both mature, were fresh on the same day, neither suffered accident during the experiment, yet Eva produced 1057 pounds of milk and 12 pounds of fat out of an extra feed of 112 pounds of hay and corn stover. This difference in favor of Eva is far greater than any per cent. of profit the dairyman may hope to make, and it teaches that in the last analysis profits will depend upon careful selection of the animal machine that is to transform hay and grain into milk and fat and money.

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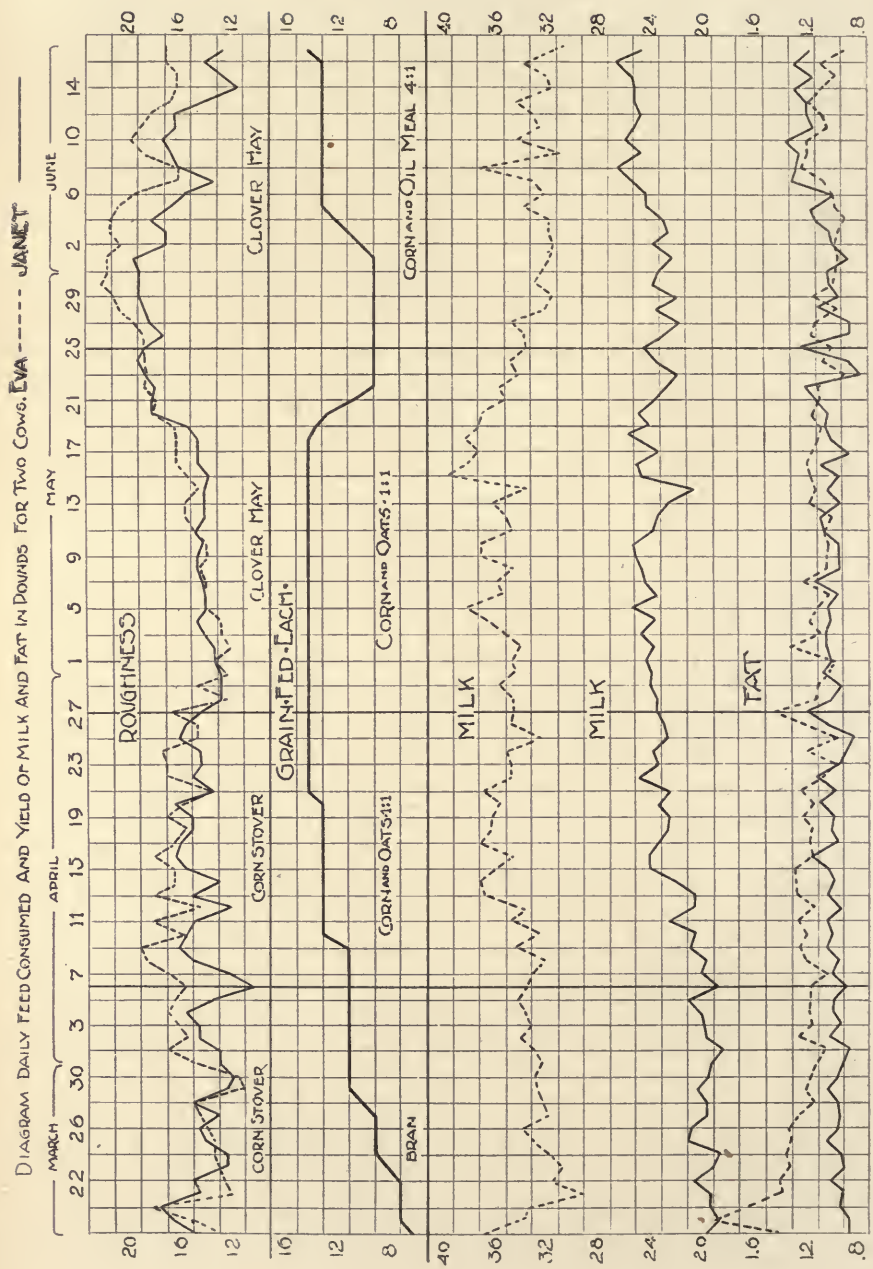
DIAGRAM DAILY FEED CONSUMED AND YIELD OF MILK AND FAT IN POUNDS FOR TWO COWS. EVA ----- JANET
MARCH
APRIL
MAY
JUNE
ROUGHNESS
CORN STOVER
CLOVER HAY
GRAIN FED EACH
CORN AND OATS 1:1
BRAN
CORN AND OIL MEAL 4:1
MILK
FAT